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## SUMMARY OF RECENT ABSTRACTS \*

## III. MALARIA †

*General*

VAUCEL *et al.* (p. 530) have issued a French version of the WHO monograph on the terminology of malaria, which should greatly help to clarify the subject.

The Silver Jubilee Number of the *Indian Journal of Malariology* (p. 839) contains special articles by many eminent malariologists: SINTON on lacunae in our knowledge; MANWELL on evolution and the malaria parasites; GARNHAM and BRAY on absence of cross-immunity between *Plasmodium cynomolgi* and *P. gonderi*; MACDONALD on a new approach to epidemiology; JASWANT SINGH on problems of chemotherapy; HENDERSON on anopheline resistance to insecticides; MOHAN on sporogony in resistant and non-resistant mosquitoes after exposure to DDT; VISWANATHAN *et al.* on nocturnal behaviour of *Anopheles culicifacies*; CHRISTOPHERS on policy of malaria control; COVELL, PAMPANA, RAJINDER PAL and SHARMA, KNIPE, RAO (B. A.), MEHTA, and RAO (V. V.), separately, on various aspects of control. The whole forms an important and stimulating contribution to the literature of malaria, in which much of the progress made in recent years is surveyed and assessed.

*Epidemiology: Transmission*

SMITH (p. 967) describes the history of malaria in England near the river Thames, where *A. maculipennis atroparvus* breeds in the saline marshes and where the disease was well known until recent times. Outbreaks occurred after the 1914-18 war in association with a camp

\*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1956, v. 53. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

† For previous articles on malaria in this series see the March and April issues of the *Tropical Diseases Bulletin* each year since 1939.

receiving soldiers from abroad, but none have occurred recently. An autochthonous case of *P. vivax* malaria is reported from Holland by DE JONG and KRAAN (pp. 709, 967); the infection probably originated in a man who had been in Korea and who was a healthy carrier; he lived near a fresh-water breeding place of *A. m. atroparvus*. FISCHER and SCHUPP (p. 968) report *A. m. messeae* and *A. m. typicus* from the area of Lake Constance.

During the campaign against malaria in Sardinia *A. m. labranchiae* was reduced to very low density, and has remained so, but LODDO *et al.* (p. 1090) show that the treated zones have been re-invaded by other anophelines—*A. claviger*, *A. algeriensis*, *A. marteri* and *A. hispaniola*. MARIANI and CEFALÙ (p. 848) describe the anophelines of Sicily.

ABUL-HAB (p. 144) attempted to find a means of differentiating the larvae of *A. maculipennis* from those of *A. sacharovi*; he thinks that two items might be included in existing keys—the details should be sought in the original paper. *Anopheles sergenti* is the most important vector of malaria in Israel. In an account of its biological characters SALITERNIK (p. 7) shows that very little water is needed for the aquatic stages, and that these can stand considerable changes in temperature. The quickest development takes place in summer. Females feed on man and animals indoors and outside at night. In Northern Iraq, *A. sacharovi* does not undergo complete hibernation but its biological activity is reduced. ABUL-HAB (p. 1090) shows that it tends to congregate in houses but continues to feed and thus replenish fat-body, and there is incomplete suppression of ovarian development. An account of the anophelines of North Africa and the Mediterranean Basin is given by SENEVET and ANDARELLI (p. 848), who (pp. 7, 968) have constructed a key for identification of larvae of anophelines of North Africa.

SENEVET *et al.* (p. 1214) give an account of *A. multicolor* in Algeria, where, although proof that it is a vector is lacking, circumstantial evidence indicates that it should be seriously suspected.

SHUTE (G. T.) (p. 969) describes a method for maintaining colonies of East African strains of *A. gambiae*. OVAZZA and NERI (p. 849) give an account of the anophelines of the Addis Ababa region of Ethiopia. Malaria occurs at altitudes of 6,400–6,900 ft. and in these areas *A. gambiae* larvae have been found, with those of several other species.

In an intensive study of the transmission of malaria by *A. gambiae* and *A. funestus* in a holo-endemic area of northern Uganda where the parasite rate rises to 99 by the age of 12 months, DAVIDSON (p. 145) shows that the malaria inoculation rate calculated from parasitological data is probably about 1 truly infective bite every 66 days, this rate being influenced by the body defence mechanism (see also COLBOURNE and WRIGHT, below). He estimates that 3.6 per cent. of feeds on man would result in infection of the mosquitoes. One truly infective person could originate some 1,600 secondary cases in the course of an untreated infection in which the subject was infective to mosquitoes for 80 days, and to



control transmission it would be necessary to reduce this basic reproduction rate from about 1,600 to less than 1. This could be done by increasing the daily mortality of the mosquitoes from 3 and 7 per cent. for *A. gambiae* and *A. funestus*, respectively, to 30 per cent., or to 50 per cent. of those actually entering houses. This could be achieved by residual spray with DDT every 6 months, BHC every 3 months, or dieldrin every year, in appropriate doses.

SMITH (p. 9) gives an account of the resting habits of *A. gambiae* and *A. funestus* in African huts on the island of Ukara, Tanganyika. GILLIES (p. 276) has shown that a notable proportion of wild-caught female *A. gambiae* and *A. funestus* are in the "pre-gravid" state, when a single blood meal allows egg development to proceed only to stage II, and another blood meal is necessary for full maturation. Such mosquitoes are mainly those which have newly emerged and have had only the first blood meal. The author discusses the relationship between the prevalence of mosquitoes of this kind and the age-composition of the mosquito population. He (p. 711) has made an estimate of the density of *A. gambiae* and *A. funestus* in a village of East Africa, and notes that the transmission of malaria is maintained at a high level by small densities of these mosquitoes.

VAN SOMEREN *et al.* (p. 400) describe the mosquitoes of the coast of Kenya.

HALCROW (p. 1216) shows that in spite of the malaria eradication scheme in Mauritius, *A. gambiae* has not been eliminated—it has even increased in numbers. In Africa it is a notorious vector, but not in Mauritius, and it is not a domestic mosquito, it feeds largely on animals. He gives an account of its behaviour and ecology. In a survey of the anopheline mosquitoes of the plateau region of Madagascar LACAN (p. 146) notes that *A. funestus* and *A. gambiae* are much less common than formerly, and this may be attributed to the use of DDT for several years. The *A. gambiae* caught still show evidence of human blood meals, but they are found out-of-doors or in stables rather than in houses. Similarly, HAMON (p. 252) notes that in Réunion, where DDT has been used for some years, *A. gambiae* is now mainly exophilic in habit, biting voraciously out-of-doors in the evening.

COLBOURNE and WRIGHT (p. 531) report a series of malaria surveys of the Gold Coast, where *A. gambiae* and *A. funestus* are the main vectors and *P. falciparum* the predominant parasite (*P. vivax* is not recorded). The risk of infection in the centre of Accra is very considerably less than elsewhere, but this is not adequately reflected in the normal malariometric data, which show differences, but much less in degree. It seems that the apparent inoculation rate derived from mosquito studies is roughly matched by a successful inoculation rate of the same order measured on infants, whereas elsewhere many inoculations do not result in infection of children, and this can only be attributed to immunity. In the Gold Coast the first attacks of malaria are fatal to about 5 per cent.

of children, and cause considerable disability to many. Partial control in the highly endemic areas would probably reduce endemicity to the state seen in central Accra, which would be only slight improvement; to be beneficial, control should be pushed to complete stoppage of transmission.

In a study of mosquito breeding in earthenware pots of water put out at Ibadan, Nigeria, MELLANBY (p. 1057) found *A. gambiae* larvae to be commonest in the dry season, possibly because other breeding places were then scarce.

An account is given by ADAM (p. 1215) of the anophelines of the southern French Cameroons, where the main vector is *A. gambiae*, and subsidiary vectors are *A. funestus*, *A. moucheti* and *A. nili*. After insecticidal treatment of the houses *A. funestus* and *A. nili* disappeared from the villages though their larvae could be found in the forest. *A. gambiae* also disappeared from the houses in the daytime but persisted in the open, and larvae were still common in the breeding places. *A. moucheti* does not move far from its breeding places and should easily be dealt with.

GELFAND (p. 533) has published a study of *A. gambiae* and *A. melas* in a coastal region of Liberia, where both are vectors of malaria and filariasis. *A. gambiae* is most abundant in the rains and *A. melas* in the late dry season and early rains, but this seasonal variation is probably a local phenomenon and may not be the same everywhere. Both species feed readily outside but enter human habitations without hesitation. The populations of *A. melas* vary with tidal fluctuations, the larvae being found in brackish water whereas those of *A. gambiae* are in fresh water. From examination of the maxillary index of *A. gambiae* in Liberia, Fox and Fox (p. 534) conclude that there is no evidence that paucidentate and multidentate races exist, as has been supposed.

Malaria is fairly prevalent in the islands of São Tomé and Príncipe, Portuguese Guinea, where CAMBOURNAC and GÂNDARA (p. 275) found a spleen rate of 42.8 per cent. in children, and a parasite index of 21.7 per cent.

KRISHNAN (p. 11) gives a list of vectors in India, mentioning the transmission seasons of *A. culicifacies* and *A. fluviatilis* in the various areas.

In an account of the anophelines of part of Nepal PETERS *et al.* (p. 400) name the 15 species found, noting particularly *A. fluviatilis*, *A. culicifacies*, *A. maculatus* and *A. splendidus*. Malaria infection was found in *A. fluviatilis*. SRIVASTAVA (p. 969) shows that in Uttar Pradesh, with the clearing of the jungles, *A. minimus* is now rapidly disappearing. *A. fluviatilis* is now the main vector, with *A. culicifacies* a secondary vector in the monsoons. *A. stephensi* is important in towns.

In India, precipitin tests indicate that *A. culicifacies* is predominantly zoophilic; BHATIA (p. 711) found that the proportion of specimens having fed on man varied inversely with the proportion of cattle in each village, and with the density of the mosquito.



In Mysore *A. fluviatilis* breeds mostly in running streams with marginal vegetation. More adults were caught in cattle sheds than in human dwellings, and the anthropophilic index was low. BHOMBORE *et al.* (p. 1217) remark that there is disparity in the various reports about the behaviour of *A. fluviatilis* in different regions, which may be due to the existence of biological variants. In experiments to compare the susceptibility to infection of *A. fluviatilis* and *A. stephensi* MOHAN (p. 147) showed that, although there are certain differences, both species are highly susceptible to *P. falciparum*.

MISRA and DHAR (p. 139) report on malaria in Tripura State, India, where the spleen rates are high, especially along the foot-hills close to the streams. *A. minimus* was the only species found infected. A residual spray campaign was started in 1953.

VANKAT RAO (p. 1309) shows that *A. sundanicus* in India is limited to the west coast, and POSTIGLIONE and VENKAT RAO (p. 1309) that it has been recorded throughout the Arakan region, and in the Delta region of Burma.

In part of Malaya near an aboriginal settlement where cattle are not kept, DAVIDSON and GANAPATHIPILLAI (p. 1310) report that *A. maculatus* is probably the only vector. It feeds mainly on man and chiefly out-of-doors, though it will enter houses. Other anophelines are found but are not important for malaria.

In part of Sarawak *A. leucosphyrus leucosphyrus* is the main vector; COLLESS (p. 970) describes its behaviour, noting an abrupt increase in catches in wet weather, which is probably a reflection of the readiness of females to enter houses rather than of increase in breeding. *A. karwari* is not thought to be important as a vector, except perhaps in Malaya, but METSELAAR (p. 401) has now found that it is an important vector in part of Netherlands New Guinea; it also probably transmits *Wuchereria bancrofti*.

BLACK (p. 11) thinks that the behaviour of *A. farauti* in Papua and New Guinea would encourage a policy of control by residual insecticides. Pig is a not unusual host and positive tests for dog have also been found. In the New Hebrides *A. farauti* is the only anopheline; it breeds in river valleys up to 1,100 feet. LAIRD (p. 11) also found *A. punctulatus* on Guadalcanal, breeding up to 1,900 feet.

BLACK (p. 140) has published an extensive account of malaria in the South-West Pacific, where *A. farauti*, *A. punctulatus*, *A. bancrofti*, *A. subpictus* and (in North Queensland) *A. amictus hilli* are vectors in the various areas. Control is attempted in some of the countries and islands by insecticides or by drug prophylaxis. War-time measures achieved considerable control in a large population of non-indigenous people, and some of those measures could be effective in peace-time if the organization was adequate. The author makes certain suggestions on this point. One is that research is needed on the behaviour of *A. farauti* and *A. punctulatus* and their reaction to residual insecticides.

Malaria still occurs in Australia, and BLACK (p. 5) reports 47 deaths from it in the period 1947-52. Epidemics have been recorded in the past, and the author stresses the importance of bearing the disease in mind.

KNIERIM *et al.* (p. 251) have been able to maintain egg production in *A. quadrimaculatus* and *Aedes aegypti* by feeding them on preserved blood. Previous work has shown that *A. quadrimaculatus* (and *Aedes aegypti*) will develop viable eggs in the absence of blood if fed on skim milk and honey on a saturated pad; LEA *et al.* (p. 1310) have now determined which proteins, and which amino-acids, are essential for this process. Minerals may be essential, and the effect of vitamins is being investigated.

JEFFERY (p. 1403) estimates the average blood meal of *A. quadrimaculatus* as 3.3 cmm., *A. albimanus* as 2.4 cmm. and *Aedes aegypti* as 2.6 cmm.

Malaria exists in California, but is very unstable. GRAY (p. 1403) makes the point that transmission is usually ascribed to *A. freeborni*, but he has observed that the factors which lead to epidemics have been those which lead to multiplication of *A. punctipennis*, and that the most profuse multiplication of *A. freeborni* has often been without ill effect. In spite of the fact that *A. punctipennis* usually bites out of doors, circumstantial evidence suggests that it may be more important than previously thought.

In part of Mexico malaria was quite prevalent, and in 1949 a control programme of residual spray with DDT was suspended as being too costly. CERVANTES GONZÁLEZ (p. 6) gives a list of vectors, and notes that a severe outbreak occurred after extensive flooding which resulted from a cyclone. A later spray campaign is proving satisfactory. VARGAS and MARTÍNEZ PALACIOS (pp. 401, 1404) list the anophelines of Mexico according to geographical distribution, and describe them, giving keys to all stages, including eggs and pupae.

In Panama *A. albimanus* is believed to be the main vector though BLANTON and PEYTON (p. 1091) think that *A. punctimacula* may be important. A list is given of 6 other species which have been found infected.

VAN DER KUYP (p. 1311) gives an account of the mosquitoes of the Netherlands Antilles, which are not malarious though *A. p. pseudo-punctipennis* is found there. The same author (p. 143) reports on malaria in part of Surinam, where the coastal region is free though *A. aquasalis* is common; inland savannah regions are heavily infected where *A. darlingi* is present.

RACHOU *et al.* (p. 7) discuss the vectors in southern Brazil, including *A. darlingi* and *A. albitarsis* and members of the subgenus *Kerteszia*. Control by DDT house spray is quite satisfactory. RACHOU *et al.* (p. 278) show that epidemic waves of malaria along the tributaries of the Parana-passema River, Brazil, are usually preceded by the dispersion of *A. darlingi* in the same direction; between epidemics this mosquito practically



disappears from those areas. They (p. 402) show the geographical distribution of anophelines in Southern Brazil.

DE ANDRADE and RACHOU (p. 402) have examined the flora and fauna of the waters in which *A. darlingi* breeds in Southern Brazil.

#### *Transfusion and Syringe-Transmitted Malaria*

ATIENZA (p. 278) reports cases of malaria (mostly *P. vivax*) in recipients of blood transfusion in the Philippines; the blood had been kept at 4°–6°C. for an average of 5 days. CODA *et al.* (p. 535) report similar cases in Brazil, in spite of examination of the blood and questioning of the donors about previous attacks of malaria. DE PAOLA (p. 852) records a case of transfusion quartan malaria with renal complications which were relieved by treatment with quinine and mepracrine.

KEITEL *et al.* (p. 1315) describe quartan malaria in a drug addict in Washington, D.C., probably acquired from a contaminated syringe, and a congenital infection of the same kind in her child. The child had nephrosis which cleared up under treatment with chloroquine.

#### *Aetiology*

SHUTE (P. G.) and MARYON (p. 1210) discuss the position of malaria parasites in relation to red cells, concluding that they are probably attached to the cell surface, but FULTON and FLEWETT (p. 1211), after studying *P. berghei* and *P. knowlesi* by electron microscopy and phase-contrast microscopy, in infected cells cut to thicknesses down to 0.01  $\mu$ , conclude that the parasites are intracellular.

WOLCOTT (p. 143) describes the chromosomes of the 4 species of human malaria parasites as seen on phase-contrast microscopy.

In work on malarial pigment DEEGAN (p. 1313) shows that haemoglobins are stable in M/10 borate buffer, which is suitable for work on the extraction of the pigment when it is associated with haemoglobin. DEEGAN and MAEGRAITH (pp. 1313, 1314) found that the properties of extracted pigment material could not be explained on the basis of its haematin nature alone, but that more probably a complex of haematin and denatured protein was involved.

MORIN (p. 398) in the French Cameroons noted that sexual forms of malaria parasites were scanty in blood films, and investigation indicated that they were less readily produced in symptomless (rural) cases than in clinical (hospital) cases. The proportion of gametocytes was observed to fluctuate seasonally, and the marked fall in the number of recent infections (as a result of mosquito control) was accompanied by a rise in the proportion of gametocytes. The reason was probably that the specimens found positive for malaria parasites were from old-standing cases.

There are advantages in the storage of sporozoites from mosquitoes, for use in inducing malaria, and JEFFERY and RENDTORFF (p. 709)

describe a technique for storage below  $-70^{\circ}\text{C}$ . The sporozoites remained viable and infective for about a year. Asexual forms of the parasites kept at similar temperatures remained viable and infective even longer.

MELVIN (p. 13) has shown that malaria parasites can be identified in blood clots for as much as 9 days, depending on the temperature at which the clot is kept. Species can be differentiated for nearly as long but distortion and poor staining may make this difficult.

RODHAIN (p. 1212) has shown that sporozoites of *P. vivax* can develop in the chimpanzee. He described the finding of exo-erythrocytic schizonts in the liver of a chimpanzee after infection with sporozoites of *P. vivax*. It was most unlikely that they could have come from any other source. He (p. 1213) also found pre-erythrocytic forms in another chimpanzee infected with sporozoites of *P. vivax*.

WINCKEL (p. 399) discusses the long latency characteristic of the strain of *P. vivax* used in the Netherlands for experimental transmission but notes that it produces early primary attacks in some of the cases.

JEFFERY (p. 713) treated with chloroquine neurosyphilitic patients infected with sporozoites of the Chesson strain of *P. vivax*, leaving the treatment until they had had as many peaks of fever as their condition warranted. There were extreme variations in patterns of infection and relapse, and the interval between treatment and relapse appeared to be a function of immunity rather than of dosage, excretion rate of the drug, or quantum of infection.

The infectivity of 2 strains of *P. falciparum* for anophelines was tested by JEFFERY and EYLES (p. 710) who found that for the first 2-4 days of the disease the gametocytes, though numerous, were non-infective; for the next 30 days infection rates of mosquitoes were very high, and late in the disease, even when gametocytes were scanty, mosquitoes became infected, especially after the recurrent appearance of gametocytes. The strains differed in some respects. People with non-symptomatic intermittent parasitaemia may therefore be highly dangerous in that they can infect mosquitoes, and such cases are often undetectable in mass surveys.

In the French Cameroons LANGUILLON *et al.* (p. 846) found *P. ovale* in 0.42-0.54 per cent. of children, usually in association with *P. falciparum* or *P. malariae*.

*P. malariae* is notoriously difficult to transmit by mosquitoes, but SHUTE (P. G.) and MARYON (p. 847) succeeded in transmitting a Lagos strain through *A. maculipennis atroparvus*. In a malaria survey of part of Ruanda, Belgian Congo, CHARDOME *et al.* (p. 1401) found that about 60 per cent. of the positive slides showed *P. malariae*; very few showed *P. vivax*. LENTINI and TECCE (p. 851) report a case of *P. malariae* malaria with relapse after 45 years of freedom from symptoms and signs, during which time a fresh infection was not possible; SHUTE (P. G.) and MARYON (p. 847) report 2 cases in which this infection persisted for 32 and 12 years, respectively.



*Malaria and Abnormal Haemoglobins*

In the course of a paper on sickle-cell anaemia and haemoglobin C, ALLISON (p. 1267) touches on the subject of the advantage to sickle-cell heterozygotes over normal homozygotes in relation to malaria.

In East Africa Foy *et al.* (p. 148) in some areas found no association between sickling and the parasite rate or the parasite density, but in one area there was a very strong association. No obvious explanation could be found and the authors discuss the complexity of the problem and its genetic bearings. RAPER (p. 1044) examined the records of children admitted to Mulago Hospital, Uganda, and found that for sicklers (heterozygotes) malaria was less frequently a cause of admission than for non-sicklers, and that the death rate from cerebral malaria was less in the sicklers. Malaria is therefore more likely to cause the death of normal homozygotes than of those carrying the sickling gene. In surveys of populations in Accra and in the Northern Gold Coast, for the incidence of sickling and malaria, COLBOURNE and EDINGTON (p. 845) found a significant difference in favour of sicklers in Accra but almost none in the other area. This may be due to the fact that transmission of malaria is more intense in the north, and therefore that it would be necessary to examine very large numbers of children under the age of 1 year to discover any protective action, or it may be that haemoglobin C exists there and may have a protective function, which would be missed in a mere comparison of sicklers and non-sicklers. Other work indicated that in Accra sickling provides little protection in children of school age.

By examining the process of sickling in blood taken from 3 malarial Liberian schoolchildren (according to a technique described in the abstract) MILLER *et al.* (p. 1312) found indications that the special haemoglobin in the red cells does not prevent invasion by *P. falciparum* and that cells containing that haemoglobin are as susceptible to invasion as those containing normal haemoglobin. On the other hand the authors think that the final fate of the parasite in cells containing the abnormal haemoglobin may be premature death in the capillaries of the internal organs, and in this way the progress of an infection could be lessened.

BEZON (p. 921) in a holo-endemic area of Togoland found no strikingly significant difference in the parasite rates of sickling and non-sickling children aged 1-12, but in comment Lehmann points out that at these ages in a holo-endemic area the influence of acquired immunity would be great, and the result reported is therefore not surprising.

*Immunity: Clinical Findings*

SERGEANT (p. 1091) discusses premunition, in which the protective effect is achieved largely by the action of phagocytes, whereas true immunity is a humoral activity. PARROT (p. 712) contends that premunition does not lead to true immunity (of the kind which persists after the infection has disappeared). He thinks, however, that after the

apparent disappearance of malaria parasites their antigens may persist for some time, and he suggests that this state should be known as residual premunition.

FREYVOGEL (pp. 1208, 1209), from experimental work on birds and observations on man in East Africa, concludes that at high altitudes some resistance to malaria is present which is not prominent at lower levels, though there is no difference in the course of the infections once they are established. He discusses the possible reason for this.

An investigation in students from the Gold Coast who came to Britain for periods of not less than 2 years suggested to COLBOURNE (p. 275) that in that period they had lost some, but not all, of their immunity.

In Uganda HOLMES *et al.* (p. 230) found a relationship between the level of serum gamma globulin and the incidence of malaria, which may indicate that the humoral element of immunity to malaria may be a gamma globulin. VAN SANDE (p. 1405) studied the serum proteins in malaria by means of micro-electrophoresis, observing an increase in gamma globulin and a decrease in albumin. DEMAAYER *et al.* (p. 356) in the Belgian Congo found low levels of serum albumin and high levels of globulin, which indicate nutritional imbalance. Malaria is also found, and it still further lowers the albumin level (and also the haemoglobin level).

SCHNEIDER and HARTMANN (p. 850), investigating the Henry reaction, found it to be related to the haemolysis resulting from malarial infection, not to the infection itself. It may be negative when malaria can be shown to exist.

In African patients in Dakar PAYET *et al.* (p. 149) think that malaria can be responsible for chronic cirrhosis of the liver. In support of this they claim a significant reduction in the incidence of cirrhosis in areas of anopheline control. A syndrome of splenomegaly, anaemia and hepatomegaly is described from South Arabia by FAWDRY (p. 94), who concludes that dietary protein deficiency and malaria could account for it. Chronic splenomegaly has long been recognized in Calcutta, and CHAUDHURI *et al.* (p. 1386) think that malaria and malnutrition are important aetiological factors.

RONNEFELDT (p. 971) discusses endemic malaria and the anaemia it gives rise to; the paper cannot satisfactorily be summarized more than in the original abstract.

NORTH and LEHMANN (p. 149) report a case in which a tuberculin test appeared to provoke an attack of *P. vivax* malaria in a man who had not had an attack for several years.

RAYMOND and PUJOL (p. 713) report a case of spasm of both femoral arteries, apparently the result of *P. falciparum* malaria, which cleared up rapidly on treatment with antimalarial drugs.

GAIRDNER and SHUTE (P. G.) (p. 536) treated patients with nephrosis by means of induction of malaria, and claim success in some of them, obtaining long-lasting remissions. They give only a few details of the



malaria therapy employed. GILBERTSEN and BASHOUR (p. 713) also report success in a few patients with nephrosis treated by means of blood-induced *P. vivax* malaria. There was relief of hypertension, and the authors consider this a valuable treatment for that condition in patients unsuitable for steroid therapy.

WAUTIER (p. 1207) observed malaria in a number of infants 4–12 weeks old in the Belgian Congo. They were in a town which had been well treated with insecticides, and they were kept under mosquito nets from birth onwards, and the author suspects that they were cases of congenital malaria.

KNÜTTGEN (p. 535) describes the clinical features of malaria in persons taking suppressive chloroquine, sometimes irregularly. The symptoms were mild and the onset insidious.

COLBOURNE (p. 1309) shows that a substantial increase in the parasite rate may be expected if 1,000 fields of thick blood films are examined instead of the usual 140 fields. Charles Wilcocks

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## MALARIA

*In this section abstracts are arranged as far as possible in the following order:—Human malaria—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control; Animal malaria—monkeys, other animals, birds.*

See also p. 339, I. LEHMANN & RAPER, **Maintenance of High Sickling Rate in an African Community**; II. WILSON, **Sickling in African Community**.

GUTTUSO, C. & LIPPARONI, E. Ulteriori ricerche, osservazioni e rilievi sul problema malarico al Villaggio Duca degli Abruzzi, Somalia—Identificazione di specie aedine e culicine. [**Further Studies on Malaria in the Village Duca degli Abruzzi, Somalia. Identification of Mosquito Species**] *Riv. di Malariologia*. 1956, June, v. 35, Nos. 1/3, 1–20. English summary.

This is an account of mosquitoes and malaria in the village of Duca del Abruzzi in Somalia [this *Bulletin*, 1951, v. 48, 866]. The larval breeding foci are discussed with a few notes on measurements of salinity and pH. It is noted that in some areas there are man-made breeding sites, such as irrigation channels and pits dug in the bed of the river in the dry season. Captures of adults (by pyrethrum spraying) at different times of the year are analysed in terms of culicines and anophelines. The females of the latter are noted as fed, unfed, gravid or with fat-body,

etc. Over 90 per cent. of the mosquitoes collected from houses were culicines; of the anophelines 97 per cent. were *A. gambiae* and the remainder *A. pharoensis* and *A. coustani*.

The density of anophelines was strongly correlated with river flow in the riverine villages, because, when the water level was above a certain height, it flowed out into irrigation channels and greatly extended breeding. Away from the river the rainfall was the main influence on breeding. The interaction of rainfall and river level produced the following annual sequence. Anophelism is highest in October to December during the second flood period and the beginning of the "little rains"; from January to April (the dry season) the numbers fall to a very low level; in May to July the mosquitoes return (with the first annual flooding and the "big rains") but the numbers fluctuate and are not so high as in November; in August and September numbers are low again.

Malaria transmission occurs all through the year (except, perhaps, towards the end of the dry season) being at a maximum in the period October–December. The epidemiological status is endemic, with increases to epidemic form, with spleen indices above 50 per cent. But it is difficult to generalize as the type varies in different regions; some of the inhabitants are nomadic and others static, for example. DDT spraying has been in operation for some years, at first over a range of 15–16 km. but later only within 3 km. and somewhat erratically. The value of the residual treatment is reduced by the habit of continual replastering of walls by the inhabitants. The authors describe a simple test for DDT residues, in which wall scrapings are added to water containing mosquito larvae to assay its effectiveness. [Not a very precise test.]

J. R. Busvine

FIELD & SHUTE, **The Microscopic Diagnosis of Human Malaria. II. A Morphological Study of the Erythrocytic Parasites.**

This book was reviewed on p. 110.

BASU, P. C. & RAY, A. P. **Dividing Forms of *P. falciparum* in the Peripheral Blood of Adults.** *Indian J. Malariology*. 1956, Sept., v. 10, No. 3, 269–71, 1 pl.

"Two cases of *P. falciparum* infection in adults, with peripheral schizogony, are described. The cases were without the grave implications. The morphological features of the parasites are presented.

"The infections were amenable to oral and parenteral chloroquine treatment.

"The suggestion that peripheral schizogony may be a strain character, is further stressed."

[See this *Bulletin*, 1946, v. 43, 8.]



BINSON, G. & DOUCET, J. Lutte anti-moustique à Bouaké (Côte d'Ivoire). Étude de la faune. [**Mosquito Fauna of Bouaké, Ivory Coast, and their Control**] *Méd. Trop.* Marseilles. 1956, July-Aug., v. 16, No. 4, 524-33, 1 map & 1 chart.

Bouaké, in the Ivory Coast, is a town of about 40,000 persons and lies inland at the junction of the forest and savannah zones. Mosquito control is now in progress, adult control with DDT, gamma BHC or dieldrin being supplemented by antilarval measures. This paper records the species of mosquitoes in the area before these measures were taken. Numerous tables provide information on the relative importance of a wide variety of breeding places for the different species. *A. gambiae* is the common anopheline, the only other reported being *A. maculipalpis*. *Culex fatigans* [*C. pipiens fatigans*] appears to be quite widespread, breeding in several kinds of water collections. *Aedes aegypti*, *C. pipiens* [*C. p. pipiens*] and 9 other culicines, mostly species of *Culex*, complete the list.

D. S. Bertram

NEOGY, B. P. & KACHROO, P. **Preliminary Observations on Nutrition of Anopheline Larvae.** *Bull. Nat. Soc. India for Malaria & other Mosquito-borne Dis.* 1956, July, v. 4, 114-25, 2 figs. [19 refs.]

Larvae of *Anopheles* from various localities in West Bengal were dissected and the algal food within the gut was identified and classified according to species or genus. Sixty-one algae are listed from 11 species of *Anopheles*. It is concluded that the species are mainly herbivorous, depending mainly on algae belonging to the Conjugales, Bacillariophyceae and Chlorococcales. Cannibalism was not observed in the species studied. Brief notes are given on feeding behaviour and previous records of food. [Table I and Figure 2A are confusing as the total numbers of algae recorded per species of *Anopheles* do not agree with the totals of actual species of algae recorded for each species.]

B. R. Laurence

See also p. 361, VARGAS, Llave numérica para identificación de larvas en cuarta fase de Anophelini en Costa Rica. [**Numerical Key to the Fourth Instar Larvae of the Anophelines of Costa Rica**]

FRIZZI, G. & RICCIARDI, I. Introduzione allo studio citogenetico della fauna anofelica del Brasile. [**Introduction to the Cytogenetic Study of the Anophelines of Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1955, Oct., v. 7, No. 4, 399-407, 3 figs. [11 refs.] English summary.

The English summary appended to the paper is as follows:—

“The Authors present a synthetic review of the taxonomic situation in the two complexes of the subgenus *Nyssorynchus* and give notice of their

preliminary studies on salivary chromosomes of the *aquasalis*. The chromosomic map has been drawn in order to have a standard for the comparison of the chromosomic structure in the species of the *tarsimaculatus* complex. According [to] the Authors the adoption of the cytogenic method will contribute efficiently to the exploration of such a complex, both detecting the affinities between the species and determining the composition of the larval populations and their geographic and seasonal variation. Preliminary information is given on cytogenetics of the species *A. albimanus*."

[See also this *Bulletin*, 1957, v. 54, 5.]

VELOSO, H. P., FONTANA, P., Jr., KLEIN, R. M. & DE SIQUEIRA-JACCOUD, R. J. Os anofelinos do sub-gênero *Kerteszia* em relação à distribuição das bromeliáceas em comunidades florestais do município de Brusque, Estado de Santa Catarina. [*Kerteszia* Mosquitoes in relation to the Distribution of Bromeliads in Forest Communities in Brusque, Santa Catarina, Brazil] *Mem. Inst. Oswaldo Cruz*. 1956, June, v. 54, No. 1, 1-86, 20 figs., 6 maps, 12 graphs & 3 pls. [28 refs.] English summary.

The maritime (Atlantic) coast of Santa Catarina is one of the principal areas of Brazil affected by malaria due to vectors breeding in the water which collects in the leaves of Bromeliaceae; the vector species concerned are *Anopheles* (*Kerteszia*) *cruzii*, *A. (K.) homunculus* and *A. (K.) bellator*. In this paper the authors describe the results of a detailed and comprehensive ecological investigation of the problem, presenting a study to which a concise abstract cannot do adequate justice.

An initial survey of several forests in the region enabled a number of community types to be differentiated; one of each of these was selected for more detailed study, particularly in relation to the distribution of microclimates functioning as suitable biotopes for the vector species. In determining the ecological relationships, 4 indices were postulated, namely (1) positivity index—the relative proportion of bromeliads in which larval forms were present, (2) larval index—the mean number of larvae per positive bromeliad, (3) oviposition index—the product of (1) and (2), and (4) MK index—the product of (3) by the total number of positive plus negative bromeliads in unit area of 1,000 square metres. Results indicated 3 factors of principal importance; these were: (1) the volume of water per bromeliad, (2) the level from the ground at which the bromeliad was situated, (3) the number of bromeliads per unit area. It was found that the MK index was approximately proportional to the square of half the total Bromeliaceae in a given type of forest; it is therefore a function both of the ecological forest type, and of the density of bromeliads in a given area. This relationship is expressed mathematically as  $MK \propto \alpha_{10}^{(x)^2}$ , where  $\alpha$  is a qualitative factor consequent



upon the ecological environment, and  $x$  is the number of Bromeliaceae per unit area of 1,000 square metres.

Correlation with the vector species showed that of the 5 types of plant community studied, 2 (São Pedro and Azambuja "A") possessed microclimates suitable for *A. (K.) homunculus*, 2 (Azambuja "B" and "C") were favourable to *A. (K.) cruzii*, and 1 (Mueller) was suitable for all 3 vectors. On the basis of these findings, in association with the known distribution of the vector species, the authors consider that *A. (K.) homunculus* and *A. (K.) cruzii* are closely related phylogenetically, while *A. (K.) bellator* is a more distant species.

Monthly and aggregate captures of adult mosquitoes, carried out in the 3 Azambuja plant community types comprised in the investigation, and plotted for unit time of 30 minutes and for different altitude levels, showed distinct correlations with relative humidity. Similar relationships were noted in the case of captures made in the same communities at 6-hour intervals over a period of 24 hours.

[This is an extremely careful and detailed piece of work and copiously illustrated. The investigation is recorded clearly and systematically along the lines indicated above, and the text includes a complete botanical list of the plant material encountered, all identifications having been made by an authority on each particular family.]

N. R. Phillips

COVELL, G. **Some Aspects of Malaria Therapy.** *J. Trop. Med. & Hyg.* 1956, Nov., v. 59, No. 11, 253-61, 4 charts. [31 refs.]

This is the record of a lecture given by the present Director of the Malaria Reference Laboratory, Horton. He surveys the history of the therapeutic use of induced fevers and of the setting up of the unit at Horton in 1925. Since its inception, over 3,000 patients have been treated with malaria supplied from Horton and the unrivalled opportunities for malarial research have yielded over 200 papers in scientific journals. The strain of *Plasmodium vivax* known as the Madagascar strain has been maintained at Horton for over 30 years and the clinical and parasitological features associated with it have remained unaltered. Recurrences (or long-term relapses) begin with this strain at about 38 weeks after infection. This time interval for late relapses and for protracted incubation periods has been noted in strains from many parts of the world, whereas the Chesson strain has a series of short-term relapses. Study of late relapses enabled JAMES to predict the secondary wave of malaria which occurred in the epidemic in Ceylon in 1934. The use of Thiobismol to convert quotidian fever into tertian in experimentally induced *P. vivax* malaria is noted. Studies carried out on *P. falciparum*, *P. malariae* and *P. ovale* are also recorded, as is the part played by the Horton laboratory in the elucidation of the pre-erythrocytic stages of *P. vivax* and *P. falciparum*.

Immunological studies have shown the remarkable tolerance acquired

against the strain of parasite used, provided chemotherapy has been delayed, but the tolerance does not extend so completely to other strains and still less to other species.

Studies of malarial parasites in mosquitoes have been made possible by the successful laboratory transmission of all 4 species and it has been shown that the differences of the arrangement of pigment in the oöcysts enable species diagnosis to be made at this stage. It is also noted that the number of sporozoites injected on a single occasion may affect the incubation period but does not appear to influence the severity of the disease, duration of attack or gametocyte output.

The author then reviews the chemotherapeutic research which has been carried out and the use of induced malaria in diseases other than neurosyphilis. With the success achieved in neurosyphilis by the use of penicillin the calls for malarial therapy are now much reduced and therefore doubt may be cast on the future of the Malaria Research Laboratory, which in the past has depended on the therapeutic use of malaria for its maintenance.

*Frederick J. Wright*

DAVIES, C. S. **Two Cases of Daraprim (Pyrimethamine) Poisoning.**  
*Central African J. of Med.* 1956, Oct., v. 2, No. 10, 364.

The author, from Southern Rhodesia, records 2 cases of poisoning by pyrimethamine. The first was that of a European child of 16 months who gained access to a bottle of pyrimethamine tablets, apparently mistaking them for sweets, and who developed convulsions and cyanosis and died the same evening, despite appropriate treatment. It was found that 65 tablets could not be accounted for. The second case was also in a European child, aged 2½, who ate 25 tablets of pyrimethamine and developed convulsions. He recovered in 2 hours after an emetic, gastric lavage and sedation [see also this *Bulletin*, 1955, v. 52, 507 for reference to 4 previous cases].

*H. J. O'D. Burke-Gaffney*

MOURÃO, M. da C. Profilaxia do paludismo com Paludrina e Daraprim nas escolas de S. Tomé. [**Prophylaxis of Malaria with Proguanil and Pyrimethamine in Schools of S. Tomé**] *Anais Inst. Med. Trop.* Lisbon. 1956, Sept., v. 13, No. 3, 451-64. English summary (4 lines).

INTERNAT. DIGEST HEALTH LEGISLATION. 1956, v. 7, No. 4, 537-65.  
[13 refs.] **Malaria. A Survey of Existing Legislation.**

In these days of malaria eradication there is need of legislation adapted to modern methods of control to support and if necessary enforce country-wide programmes of control. The diversity of local factors, such as the



stage of development of the health services, the financial resources of the country, and the ecology of the vector mosquitoes, makes it impossible to draft model laws. However, this analytical review of the malaria control laws of some 20 States will be helpful to health authorities in malarious countries. Regulations can cover notification of cases of malaria, organization of control services, compulsory treatment and examination and anti-mosquito measures in specific areas of a territory, delimited as "endemic zones".

Notification of cases will become increasingly important in territories where residual insecticide spraying has been interrupted, so as to ensure rapid detection of the recurrence of malaria.

The older existing regulations are directed to antilarval measures mainly in respect of towns and villages and in relation to man-made breeding places of industrial or building operations. To-day the emphasis is on imagicidal measures or the use of residual insecticides; only the laws of British Guiana, Ceylon, Ecuador, French Guiana and Honduras stipulate that the latter must be used; of these the legislation for British Guiana is the most informative.

The legislation of Argentina, Dominican Republic, Ecuador, Mexico and Venezuela concerning antimalarial drugs (including cost to the public) is referred to.

The review ends with an appendix of the Malaria Control Legislation of Argentina and a list of references to the regulations of the respective countries from which the information has been obtained.

*R. Ford Tredre*

EICHLER, W. Malariabekämpfung durch Streuflugzeuge. [**Malaria Control by Aircraft Spraying**] 68 pp., 35 figs. [38 refs.] 1956. Jena: Gustav Fischer Verlag. [DM 7.15.]

This paper is an account of the author's experiences up to 1943 in the control of malaria at Sedes in Salonika, Semlin near Belgrade, and Teinrjuk in the lower Kuban peninsula, with emphasis on spraying insecticides from aircraft. DDT was not in use at the time. For each area, there is a brief indication of the incidence of malaria followed by a statement of the mosquito species found and their biology. Breeding places and adult resting places are illustrated by photographs, and other photographs show the methods of preparing the insecticide dusts and their dispersal from the aircraft. All of this is also described in detail in the text. Much of the subject-matter, it will be realized, is on methods of control often applied in different spheres of insect control, more recently than 1943 and, of course, with modern insecticides, particularly DDT. There seems little point in doing more than indicate the scope of this paper and commend it for the exhaustive detail of its text.

*D. S. Bertram*

CAMBOURNAC, F. J. C., GÂNDARA, A. F. & CASACA, V. M. R. Ensaio de profilaxia anti-malária pela aplicação de insecticidas de acção residual numa área rural do sul de Angola. [**Malaria Control with Residual Insecticides in a Rural Area of South Angola**] *Anais Inst. Med. Trop.* Lisbon. 1956, Sept., v. 13, No. 3, 361-70, 5 maps (4 folding) & 2 folding graphs. English summary (5 lines).

BRADBURY, F. R. & STANDEN, H. **Benzene Hexachloride Metabolism in *Anopheles gambiae*.** [Correspondence.] *Nature*. 1956, Nov. 10, v. 178, 1053-4.

Experiments with BHC-resistant and non-resistant strains of *Anopheles gambiae* exposed to alpha and gamma BHC labelled with radio-active carbon showed that the resistant strain absorbed approximately the same amount of BHC as the non-resistant strain, and also that both the resistant and non-resistant strains converted a small amount, 13 per cent. or less, of absorbed BHC to water-soluble products. The results were not affected by shortening the time of exposure of the insects to the insecticide. In contrast, similar experiments by the authors on the house-fly (*J. Sci. Food Agric.*, 1956, v. 7, 389) showed that resistant house-flies may convert more than 90 per cent. of absorbed insecticide to water-soluble products.

B. R. Laurence

SMITH, G. E. **Comparative Effect of DDT-Treated Houses on introduced *Anopheles quadrimaculatus* Adults, 1944 and 1955.** *J. Econom. Entom.* 1956, Aug., v. 49, No. 4, 523-6, 1 fig.

Some of the earliest observations on the effects of DDT house spraying on mosquitoes were made on *Anopheles quadrimaculatus* in the Tennessee valley area in 1944 [METCALF *et al.*, this *Bulletin*, 1946, v. 43, 102]. In recent years there have been suggestions that the regular use of DDT in this region has induced resistance in this mosquito [KRUSE *et al.*, *ibid.*, 1953, v. 50, 383], though subsequently it was believed that the lower susceptibility could be explained by other causes [HAWKINS and HALL, *Proc. 2nd Annual Meeting Ent. Soc. Amer.*, 1954, p. 40]. The author of the present paper set out to repeat the observations of Metcalf *et al.* to determine whether the species had changed in habits or resistance after 12 seasons of house spraying and local crop dusting with DDT.

The general plan of the experiments both in 1944 and 1955 was to study the behaviour of the mosquitoes in a small house treated with DDT and to determine their subsequent mortality. Observations continued for 87 days after spraying in 1944 and for 40 days in 1956. There was considerable variation in both sets of data and the comparisons may be summarized as follows:—



	1944	1955
Percentage mosquitoes knocked down		
in 60 minutes ... ..	38 (26-47)	31 (10-52)
Percentage leaving the house in 60		
minutes ... ..	53 (28-70)	29 (21-38)
Percentage mortality after 4 hours		
in those leaving house ... ..	90.6	80.4
Percentage mortality after 24 hours		
in those leaving house ... ..	99.0	97.4

It seems that there is slightly lower susceptibility in 1955, but the difference is not significant in view of the large variability.

*J. R. Busvine*

MONTESTRUC, E. & BERDONNEAU, R. L'endémie palustre à la Martinique est-elle définitivement éteinte? Peut-on éviter sa réapparition? [**Has Endemic Malaria been eradicated from Martinique and can its Reappearance be Prevented?**] *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3, 441-5.

*Anopheles aquasalis* can still be found in small numbers in the island of Martinique, but no indigenous case of malaria has been found since March 1952 [this *Bulletin*, 1956, v. 53, 142]. Cases occur, however, both among immigrants from neighbouring and still infected islands and in officials who have served in other parts of the world. There is thus a risk that indigenous malaria could recur. The risk could be avoided by continued search for cases and continuation of insecticide application. In discussion MORIN expounded the principles of eradication of malaria, suggesting the maintenance of surveillance, the examination of immigrants for malaria, the application of insecticides to boats and aircraft coming from malarious places, and the maintenance of an emergency service which could apply insecticides should that prove necessary.

*G. Macdonald*

BECKER, E. R., HOLLANDER, W. F. & PATTILLO, W. H. **Naturally occurring *Plasmodium* and *Haemoproteus* Infection in the Common Pigeon.** *J. Parasitology*. 1956, Oct., v. 42, No. 5, 474-8. [14 refs.]

## BLACKWATER FEVER

LE HENAND, F. A propos de deux cas de fièvre bilieuse hémoglobino-urique. [**Two Cases of Blackwater Fever in the Ivory Coast**] *Méd. Afrique Noire*. Dakar. 1956, Aug. 16-31, v. 3, No. 55, 8-9.

Two typical cases of blackwater fever in Europeans stationed on the Ivory Coast, West Africa, are described in detail. One of the patients, a

man aged 26, had resided there for 7 years; the other, aged 25, for 6 years. Both recovered under treatment with transfusions of fresh blood supplemented by injections of cortisone.

The author holds that blood transfusion from a donor of the same group is the first essential in the treatment of blackwater fever, and remarks on the striking improvement which invariably follows immediately after the first transfusion. He has also found that cortisone is of great value for inhibiting the haemolytic processes. In his opinion schizontocidal drugs are of secondary importance, the main objective in the first few hours of the attack being the treatment of shock and anaemia, of which the *Plasmodium* is not the immediate cause. Despite the powerful remedies now available convalescence is always protracted and the patient is particularly liable to infection with intercurrent diseases. The author notes that the occurrence of several cases each year in the territory indicates that drug prophylaxis is for many individuals "a dead letter".

G. Covell

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## TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—African—human, animal; American—Chagas's disease and other trypanosome infections. In each form the following order is followed:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

FAIRBAIRN, H. & WILLIAMSON, J. **The Composition of Tsetse-Fly Saliva.**

**I.—A Histochemical Analysis.** *Ann. Trop. Med. & Parasit.* 1956, Sept., v. 50, No. 3, 322–33, 4 figs. on pl. [20 refs.]

The authors made observations on the appearance of stained and unstained saliva of various species of *Glossina* during infection with trypanosomes as well as with uninfected specimens. They came to the conclusion that when trypanosomes were present something disappeared from the saliva. The primary object of the investigations was therefore to determine the nature of the salivary constituents which are altered or disappear during the development of crithidial forms and metacyclic trypanosomes. These parasites being bathed in saliva must depend completely on this substance for their development. The information which such an investigation could provide about the cultural requirements of trypanosomes and possibly on desirable properties of trypanocidal agents was obviously of great importance.

Because of the minute amounts of saliva available, histochemical observations were used at the start. For this purpose the secretion of 2 or 3 flies was obtained on grease-free slides by the method of FAIRBAIRN and CULWICK [this *Bulletin*, 1949, v. 46, 812] and fixed for different times



with a selection of reagents. A comprehensive table outlines the results obtained by different staining methods in conjunction with the various fixatives. General stains, as well as those for proteins, carbohydrates, lipids, inorganic substances and enzymes, were used. In uninfected saliva it appeared that protein or muco-protein with mucopolysaccharide, glycolipid of unsaturated character with inositol, as well as ionized calcium were present. In saliva infected with *T. rhodesiense* or *T. gambiense* carbohydrate and protein constituents appeared to have been utilized, while calcium was now present in non-ionized form. The reactions obtained with the saliva of flies infected with *T. congolense* varied a little from the above. The nature of the anticoagulant present has previously been partially characterized by LESTER and LLOYD [*ibid.*, 1929, v. 26, 263]. The present authors draw attention to the apparent anomaly that an anticoagulant should be in the saliva along with so much ionizable calcium. When the property of staining with Giemsa was lost by the saliva of flies infected with polymorphic trypanosomes, the reaction for protein, lipid and calcium also disappeared.

[This most interesting investigation has been described in greater detail than is indicated here and will repay study in the original by those interested.]

J. D. Fulton

WILLIAMSON, J. **The Composition of Tsetse-Fly Saliva. II.—Analysis of Amino Acids and Sugars by Paper Partition Chromatography.** *Ann. Trop. Med. & Parasit.* 1956, Sept., v. 50, No. 3, 334-44, 4 figs. [31 refs.]

In continuation of the investigations described in Part I of this series [above], the author has made use of paper partition chromatography for identification of the amino-acid and sugar components of tsetse fly saliva. The method of BURTT [this *Bulletin*, 1946, v. 43, 1121] was used for collection of the samples. Analyses for amino-acids were carried out on the salivary discharges of mosquitoes ranging in numbers from 30 to over 100 after collection on thoroughly cleaned microscope slides, either before or after hydrolysis with hydrochloric acid. For analysis of sugars the saliva was hydrolysed with sulphuric acid for a similar period of 24 hours at 100°C. A wide variety of solvents was used in the preparation of one- and two-dimensional chromatograms on Whatman No. 54 paper at a constant temperature around 30°C. The spots were identified by chemical methods or by fluorescence in ultra-violet light. They were then eluted in a suitable solvent and re-run in a different solvent system if required.

The 12 amino-acids identified in the salivary protein of *G. palpalis* were arginine, aspartic acid, cystine, glutamic acid, glycine, histidine, isoleucine, methionine, serine, threonine, tyrosine and valine. The amine asparagine and cysteic acid as well as  $\beta$ -alanine and taurine were also recognized. The only sugars identified were inositol and possibly the pentose arabinose.

J. D. Fulton

GORDON, R. M. & WILLETT, K. C. **A Preliminary Account of the Deposition by the Tsetse-Fly of the Infective Forms of *Trypanosoma rhodesiense*, their Subsequent Migration to the General Circulation, and their Development to the Blood Forms.** *Ann. Trop. Med. & Parasit.* 1956, Sept., v. 50, No. 3, 314-18.

Observations on the feeding process in *Glossina morsitans* (to be published) indicated that the deposition of metacyclic *T. rhodesiense* occurs at various levels in the tissues penetrated during piercing, but probably mainly at the site of lacerated capillaries. It is known (see GORDON *et al.*, *Trans. Roy. Soc. Trop. Med. & Hyg.*, 1955, v. 49, 5) that in *T. brucei* most of the metacyclic forms disperse within 20 hours of their inoculation, that no multiplication of trypanosomes occurs at the site of entry, and that blood forms are visible in the circulation within 70 hours of the infective bite. A combined inoculation and histological technique showed that tissues from the site of the bite were almost invariably negative for trypanosomes between 5 minutes and 24 hours after biting. However, subinoculation of heart blood over the same period often gave positive results; and infective trypanosomes were demonstrable in the blood of animals inoculated directly into the circulation with metacyclic forms, from immediately after inoculation until the end of the normal incubation period.

It is concluded that the metacyclic forms migrate, or are carried, rapidly from the site of deposition and develop directly into blood forms, probably in less than 24 hours; having entered the general circulation, the trypanosomes persist there throughout the incubation period, during which time they are infective. *In vitro* culture of metacyclic *T. rhodesiense*, from the salivary glands of infected flies, has demonstrated a development into forms morphologically identical with normal blood trypanosomes; this was observed initially after 4 hours, and in a large proportion of the trypanosomes after 24 hours.

The results obtained are compared with similar data for *T. vivax* and *T. avium*.  
N. R. Phillips

TRINCÃO, C., NOGUEIRA, A. R. & DE ALMEIDA FRANCO, L. T. Acção da Puromicina (Estilomicina) sobre as culturas "in vitro" do "*Trypanosoma gambiense*". [**Action of Puromycin (Stylomycin) on Cultures of *Trypanosoma gambiense* in vitro**] *Anais Inst. Med. Trop.* Lisbon. 1956, Sept., v. 13, No. 3, 429-31.

The English summary appended to the paper is as follows:—

"Having evaluated the inhibiting power of Stylomycin on the *in vitro* cultures of two strains of *T. gambiense*, on Henraard and Peel's modification of Weinman's medium, the authors have found the antibiotic to be active until the concentration of 2  $\mu$ gr/ml."

[See this *Bulletin*, 1956, v. 53, 419.]



TRINCÃO, C., PINTO, A. R., FRANCO, A. & NOGUEIRA, A. **Final Report on the First Use of Puromycin for the Treatment of Sleeping Sickness.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 784-5.

This is an account of a follow-up of the 11 of 15 patients with *T. gambiense* infection treated with puromycin [Stylomycin] who were clinically cured after 6 months' observation [this *Bulletin*, 1955, v. 52, 615].

They have now been observed clinically and by laboratory examination of the blood and cerebrospinal fluid at 12, 17 and 25 months after treatment. The findings are tabulated. These show a significant improvement in the cerebrospinal fluid. Four of the 5 whose fluid was initially abnormal reverted to normal. In one patient only, abnormal fluid persisted and this was considered to be a relapse, although (as with all the other 14 patients) the blood and gland juice were negative for trypanosomes. The patient, who was then pregnant, was treated with tryparsamide.

The other 4 patients who had relapsed had reached the nervous stage of the disease. Puromycin is now being tried in patients in this stage to test its effect in advanced cases of sleeping sickness.

It is clear therefore that 10 of the 15 patients have been clinically and parasitologically free of trypanosome infection 25 months after treatment with puromycin, during which period they had no other specific drug.

H. J. O'D. Burke-Gaffney

JASWANT SINGH, BASU, P. C. & DAVID, A. **A Natural Trypanosome (Sp.) Infection in Indian Quail (*Coturnix communis*)—Study of the Morphology in Different Avian Hosts.** *Indian J. Malariology.* 1956, Sept., v. 10, No. 3, 167-73, 9 coloured figs. on pl. & 1 chart. [11 refs.]

HERRER, A. Observaciones sobre la enfermedad de Chagas en la provincia de Moyobamba (Depto. de San Martín). [**Studies on Chagas's Disease in the Province of Moyobamba, Peru**] *Rev. Med. Exper.* Lima. 1956, July, v. 10, No. 1, 59-73, 2 figs. English summary.

An epidemiological survey carried out in 3 towns in the province of Moyobamba, Peru, revealed *Panstrongylus herreri* as the only vector of Chagas's disease. This is a markedly domestic species, with man as its principal host; in all, 60 of 205 human habitations were infested. A total of 538 *P. herreri* were captured; 296 of these were examined, and 93 (31.4 per cent.) were infected with *Trypanosoma cruzi*. Infection indices in individual towns were 18.9, 24.1 and 37.3 per cent., respectively.

Xenodiagnosis, with the use of *Triatoma infestans* and *Rhodnius prolixus*, was positive for 10 of 204 persons, 8 of whom were between 4 and 15 years old; these tests comprised about 60 per cent. of the

population of one of the towns in the survey. In addition, xenodiagnoses were carried out on 198 domestic animals; among these only 1 dog was positive.

N. R. Phillips

JACQUEMIN, P. Un dispositif pratique pour nourrir les Arthropodes hématophages. [**A Practical Apparatus for the Feeding of Triatomids**] *Ann. Parasit. Humaine et Comparée*. 1956, July-Sept., v. 31, No. 4, 476-9, 4 figs.

The author describes an apparatus for the routine feeding of Triatominae which requires the minimum of attention when in use, and can be completely inverted for upward or downward feeding of the insects, as required. The basic unit is a horizontal wooden board, of dimensions 40 by 30 by 2 cm., with a central circular cavity of  $5\frac{1}{2}$  cm. diameter into which the mouth of the insect rearing jar is fitted. In normal use the blood donor animal is held on the upper surface of the board, and over the central cavity, by means of a canvas sheet attached by eyelet holes to studs projecting from all 4 edges of the board; in reverse, this canvas becomes a "hammock" in which the donor animal is suspended. On its normally lower surface, the board has a vertical 4-sided open "box" constructed around the central cavity, which supports the rearing jar in position; the sides of the box are hinged and collapsible when not in use. The rearing jar is supported from beneath by two wide rubber straps, crossed at right angles, which affix to studs and can be stretched to increase upward pressure on the jar. The horizontal stage is supported on two collapsible boards of 20 x 30 cm., hinged to opposite edges of the horizontal board; in the inverted position, support is provided by 4 wooden legs, similarly hinged to each corner of the horizontal board.

The entire apparatus is clearly illustrated in line diagrams, and complete dimensions for construction are given. Although it is an improvement on many published methods, there are, in the abstracter's experience of rearing Triatominae, several less elaborate and equally satisfactory means of feeding which can be employed. N. R. Phillips

DIAS, E. Observações sobre eliminação de dejeções e tempo de sucção em alguns triatomíneos sul-americanos. [**Studies on Defaecation and Duration of Feeding in Some South American Triatomids**] *Mem. Inst. Oswaldo Cruz*. 1956, June, v. 54, No. 1, 115-24.

The duration of feeding, and subsequent frequency of defaecation, were investigated in 6 Brazilian species of Triatominae after the manner previously used by Wood for certain North American species [see this *Bulletin*, 1951, v. 48, 1093]. The test group for each species comprised male and female adults, in addition to nymphs, except in the case of *Triatoma sordida* (no females) and of *T. vitticeps* (no adults of either



sex). The results show considerable fluctuations, but similar irregularities occur in each stadia category for any given species. The mean time of actual feeding (contact feeding time) in minutes was 14.2 for *Rhodnius prolixus*, 18.5 for *R. neglectus*, 15.5 for *T. infestans*, 22.7 for *Panstrongylus megistus*, 20.0 for *T. sordida* and 26.8 for *T. vitticeps*. The percentages of each species-group which fed continuously were 20.0, 20.0, 47.5, 82.1, 79.2 and 90.9, respectively. The proportion of insects in each group which defaecated during, or shortly after, feeding were, for the same species, 50.0, 30.0, 30.0, 22.7, 12.5 and 0.0 per cent., respectively. The mean number of subsequent defaecations (up to 3 hours afterwards) were, in corresponding groups, 13.7, 9.6, 7.1, 3.4, 4.5 and 6.2.

For general correlation purposes, the occurrence of defaecation during feeding appears to be directly proportional to the number of defaecations subsequent to feeding, and to the frequency of interruption during the feeding act; and inversely proportional to the duration of feeding. The frequency of defaecation during feeding, which is a factor of great epidemiological importance in the transmission of Chagas's disease, was observed to increase in the order nymphs, males, females for any one species; among the species studied, *R. prolixus* is the most significant in this respect.

[It must be emphasized that the figures given indicate only general tendencies in the stadia and species concerned, and that the behaviour of any individual insect is likely to show a marked divergence from the results as given. The data from which the mean values are calculated have wide limits in many instances, and categorical interpretation of them is apt to be misleading on that account.] *N. R. Phillips*

See also p. 346, SHIELDS & WALSH, "Kissing Bug" Bite.

## LEISHMANIASIS

*In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.*

DA SILVA, J. R. & DE PAOLA, D. A punção-biopsia hepática no diagnóstico do calazar americano. [**Needle Biopsy of the Liver in the Diagnosis of Kala Azar**] *Bol. Centro de Estudos Hosp. Servidores Estado. Rio de Janeiro.* 1956, Jan., v. 8, No. 1, 1-7, 5 figs. (4 coloured on 2 pls.) [10 refs.]

The English summary appended to the paper is as follows:—

"In the present report the authors summarize their experience with needle biopsy of the liver in 15 cases of Kala-azar, emphasizing the

diagnostic possibilities of this procedure, which was positive in 66·6% of the cases."

SEN GUPTA, P. C., CHAKRAVARTY, N. K., RAY, H. N. & DAS GUPTA, B.  
**The Liver in Kala-Azar.** *Ann. Trop. Med. & Parasit.* 1956, Sept.,  
v. 50, No. 3, 252-9, 4 figs. on pl. [10 refs.]

The authors record the clinical, serological and histological findings in 15 cases of kala-azar in which liver biopsies were performed. In 12 leishmaniae were found in bone-marrow smears. In 2 in which no leishmaniae were found in the marrow, they were abundant in spleen-puncture smears. In a third patient both marrow and spleen smears were negative but a light infection with *Leishmania* was found in the liver biopsy section. Hyperglobulinaemia was present in all patients. The prothrombin time was slightly increased in 14. The thymol turbidity test showed high figures (9-37 Maclagan units) in the 12 patients in whom it was determined. The bilirubin content of the serum was between 0·1 and 0·8 mgm. per 100 ml. in 9 patients and 1·0 mgm. per 100 ml. in 2.

The histological changes showed that in addition to parasitized reticulo-endothelial cells in and around the portal tracts, there may be collections of such cells (parasitized or not) and of lymphocytes and plasma cells in different areas of the liver parenchyma resembling small granulomata; the neighbouring parenchymal cells usually show degenerative changes. Similar granulomata have been reported in the bone-marrow and spleen [this *Bulletin*, 1952, v. 49, 608; 1953, v. 50, 1030; *Bull. Calcutta Sch. Trop. Med.*, 1954, v. 1, 17]. Fatty degeneration of parenchymal liver cells only occurred in 3 patients and could be attributed to a diet deficient in protein. In 4 patients early cirrhotic changes were present but in 2 these were probably attributable to post-necrotic scarring and in the other 2 to malnutrition. It is concluded that cirrhosis is not common in uncomplicated kala azar. Histochemical study showed depletion of liver glycogen in most of the patients with intense or moderate infections.

Frederick J. Wright

DEANE, L. M. & DEANE, M. P. Encontro de leishmanias nas vísceras e na pele de uma raposa, em zona endêmica de Calazar, nos arredores de Sobral, Ceará. [**Visceral and Skin Findings of Leishmaniasis in a Fox. Case Report**] *Hospital*. Rio de Janeiro. 1954, Apr., v. 45, No. 4, 419-21, 1 fig.

The English summary appended to the paper is as follows:—

"The authors have found numerous leishmaniae in the viscera (spleen, liver and bone marrow) and very numerous in the unbroken skin of a fox *Lycalopex vetulus* (Lund, 1842) captured in the vicinity of Sobral, State of Ceará, Brazil. The distribution of the parasites in the host and the



fact that this was captured in an active endemic focus of kala-azar, suggest that the fox may act as a reservoir host of *Leishmania donovani* in the region."

LANGSJOEN, P. H. **Cutaneous Leishmaniasis: a Report of 10 Cases.** *Ann. Intern. Med.* 1956, Oct., v. 45, No. 4, 623-39, 4 figs. & 1 chart. [11 refs.]

"1. Ten cases have been presented of proved cutaneous leishmaniasis in young white soldiers, contracted in the Camp Pina area of the Panama Canal Zone.

"2. The conditions of infection, the incubation period and the course of the disease as observed in these cases have been discussed.

"3. The diagnostic clinical and laboratory features of this illness have been described.

"4. The results of treatment with Fuadin, including the occurrence of antimony toxicity, have been reported.

"5. It is concluded that Fuadin is an effective and relatively safe form of treatment in otherwise healthy young white males with this illness, though the course of therapy is quite prolonged."

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## FEVERS OF THE TYPHUS GROUP

*In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.*

DE MAGALHÃES, O. Contribuição para o conhecimento das doenças do grupo tifo exantemático no Brasil. [**A Contribution to Knowledge of the Diseases of the Exanthematic Typhus Group in Brazil**] *Mem. Inst. Oswaldo Cruz.* 1956, June, v. 54, No. 1, 279-308, 5 graphs & 13 figs. on 2 pls. [Numerous refs.] English summary.

This is a summary, brought up to date, of the many interesting contributions to knowledge made by the author in connexion with the tick-borne fever of the typhus group which occurs in Brazil. In 1953 he published a large monograph in which he gave a detailed description of the results of his extensive investigations into the disease during the previous 20 years [this *Bulletin*, 1954, v. 51, 362].

Three fevers of the typhus exanthematicus group are recognized as occurring in Brazil: (1) tick-borne typhus, which is generally regarded as the same disease as Rocky Mountain spotted fever (RMSF) but is believed by the author to be a distinct condition for which the name "neotropical typhus exanthematicus of Brazil" is proposed; (2) murine typhus; and (3) Q fever. The last-named disease does not qualify for inclusion in the

typhus group; it is not typhus-like and its causal organism is considered by many authorities as belonging to a distinct genus, *Coxiella burneti*, not *Rickettsia burneti*.

Among the special discoveries which the author states he has made are the following. In 1933 he "verified *Cimex lectularius* as the carrier of strain V.B." of the neotropical typhus infection, and in the following year he found natural infection among *Amblyomma cajennense* ticks. He showed that the dog could become infected through the digestive tract and that the goat might act as a reservoir of infection which it could transmit through its milk. He suggested that one stage in the life history of the causal rickettsia was an invisible virus and that this hypothesis explained the difficulty sometimes experienced of detecting the organism in stained smears of highly infected material from animals. He found that a protective vaccine prepared from a Brazilian strain of the rickettsia protected 100 per cent. of guineapigs from death when challenged with the living homologous strain, whereas a corresponding dose of the Parker type of vaccine, made from a strain of RMSF rickettsia, protected only 34 per cent. of guineapigs challenged with the Brazilian strain. He claims that "the Weil-Felix [test] clearly separates the two diseases—RMSF and the Brazilian disease". In the latter the titre with *Proteus* OX19 and *Pr.* OX2 rises on the average to 1 in 5,120 (+++ to +++) and with *Pr.* OXK to 1 in 640 (++) whereas in RMSF the average reading is weakly positive (+) with all the *Proteus* strains. But the most important of all the findings is that the Brazilian disease responds to treatment by the broad-spectrum antibiotics in exactly the same dramatic way as RMSF.

[In discussing the nomenclature of the fevers the author objects to the name "spotted fever" on the ground of ambiguity, but his own use of the word "neotropical" for the Brazilian disease is equally unsuitable; it is vague and probably also misleading because the fever is not likely to be restricted to the tropical zone of the New World.

The name "tick typhus", tentatively suggested 35 years ago by the abstracter as a provisional title for all the typhus-like fevers transmitted by ticks, still serves the useful purpose of indicating the two features which, taken together, distinguish these diseases from all others, and also indicates the correct lines of prevention and treatment.]

John W. D. Megaw

**Fox, I. Murine Typhus Fever and Rat Ectoparasites in Puerto Rico.**

*Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 893-900, 7 figs. on pl.

Large-scale control measures instituted in the southern U.S.A. in 1945, and involving DDT dusting to kill rat fleas, were followed by a decline in the incidence of murine typhus; in Puerto Rico a similar decline occurred (from 100 cases in 1944 to none in 1954) although no



such control was attempted there. Investigation of rat ectoparasites in Puerto Rico during the period in question showed that the proportion of rats infested with the vector, *Xenopsylla cheopis*, had decreased from 54 per cent., with 1.75 fleas per rat, in 1946-47, to 16 per cent., with 0.42 fleas per rat, in 1954-55; this decrease was more marked in residential areas (5 per cent. final infestation) than in business districts (26 per cent. final infestation). Complement-fixation tests on 279 rats in 1954-55 gave 3.2 per cent. positives at 1 in 8 dilutions compared with 3.8 per cent. positives at dilutions of 1 in 4 or above among 368 human subjects in 1955. The author concludes that such control measures as were used were not necessarily responsible for the observed decline in the incidence of the disease.

N. R. Phillips

SASA, M., IIMURO, I. & MIURA, A. **Notes on the Larva and Nymph of a New Tsutsugamushi (Trombiculid Mites) found from Mt. Fuji Area (Leeuwenhoeikiinae) (Studies on Tsutsugamushi, Part 88).** *Japanese J. Exper. Med.* 1955, Dec., v. 25, No. 6, 247-54, 4 figs. [11 refs.]

TAKIGAMI, T., KAWAMURA, A., Jr., NISHIOKA, K. & IIDA, H. **Clinical Investigation on "Ezo Fever".** *Japanese J. Exper. Med.* 1955, Oct., v. 25, Nos. 4/5, 187-95, 3 figs. [14 refs.]

This is a description of a retrospective enquiry into 49 cases of fever with rash which occurred in Hokkaido, Japan, apparently between March and October 1954. The actual investigation was restricted to the period October 3rd to 17th so that most of the information connected with symptomatology and epidemiology was obtained from the local doctors and is not very illuminating. The chief examinations consisted of complement-fixation tests with antigen prepared from *Rickettsia tamiyai* and Weil-Felix tests which were necessarily carried out at widely varying intervals after the occurrence of the illnesses.

In the only case personally observed by the authors there was a rash, resembling that of scarlatina, which faded by the 5th day of the illness. Blood from this patient was inoculated intraperitoneally into mice, without result.

The complement-fixation test was carried out in 30 patients; it was positive in 7; the titre was 1 in 10 in 5; 1 in 20 in 1, and 1 in 40 in 1. The Weil-Felix test was done in 48 patients; against *Proteus OX19* the result was negative at 1 in 20 in every patient; against *Pr. OXK* it was positive at 1 in 20 in 20 patients, at 1 in 40 in 4 patients, and at 1 in 80 in 1 patient, in whom the complement-fixation test was negative. The reaction with *Pr. OX2* was positive in 13 patients, at 1 in 20 in 8, at 1 in 40 in 3 and at 1 in 80 in 2.

The authors admit that they experience many difficulties in the diagnosis of the exanthematous diseases and that "some of them have

now remained undissolved". The name Ezo applied to fevers believed to be caused by *R. tamiyai* is said to mean Hokkaido.

The paper includes a good description of two experimental infections with *R. tamiyai* in persons who were inoculated intradermally with liver suspensions of infected mice. In both cases there were characteristic febrile attacks after incubation periods of 8 and 12 days, respectively. In one case redness and induration of the skin at the site of inoculation appeared on the 5th day; at the centre of this a vesicle appeared on the 8th day and was replaced by a bloody crust on the 10th day; this was still present on the 20th day, but it dried up and disappeared without the formation of an ulcer or eschar. In the other case there was local redness and both patients had associated lymphadenitis. The rash was discrete macular or maculopapular, appearing first on the trunk on the 12th day in one case and the 16th day in the other. The rash gradually spread to the arms and legs but did not affect the face; it persisted for about a week and there was temporary brownish staining after the rash faded. The authors' comment on the lesions at the site of the inoculation is: "Then we think the primary lesions, which are used to be considered as pathognomonic to scrub typhus, have not essential significance in Ezo fever."

In each of these two patients there was a delayed high titre reaction to the complement-fixation test with *R. tamiyai* antigen. About 5 weeks after the attacks the titres were 1 in 1,280 and 1 in 640, respectively. In both patients the Weil-Felix reaction with *Proteus OX19* was positive at 1 in 180 on the 14th day, but at the time of inoculation the titre had been 1 in 80 in one patient and 1 in 40 in the other. With *Pr. OXK* the highest titre reached was 1 in 40, and with *Pr. OX2* it was 1 in 80. *R. tamiyai* was recovered from the blood of both patients by mouse inoculation early in the febrile attacks.

It is possible to agree with the conclusion reached by the authors that their investigations justify their guessing that among the obscure febrile exanthematous diseases in Hokkaido there may be cases of illness caused by *R. tamiyai* or by a rickettsia related to it in its antigenic structure.

John W. D. Megaw

AKIBA, T., FUJIYA, H., MURAI, S., HYODO, N., IIDA, H. & SAGAE, K.

**A Case presumed to be the so-called Ezo Fever.** *Japanese J. Exper. Med.* 1955, Oct., v. 25, Nos. 4/5, 183-6, 2 figs.

The authors describe a case of exanthematic disease which they assume to have been caused by the rickettsia isolated from voles in Hokkaido, Japan, by KAWAMURA in 1954 and named by him *Rickettsia tamiyai* [see this *Bulletin*, 1955, v. 52, 622]. The clinical features of the illness resembled those in cases of rickettsial disease related to tsutsugamushi fever which have been reported in recent years from various places in Japan under various names, including Shichito fever and Ezo fever.



The present patient, a boy of 6 years, lived in Hokkaido. The features of the illness which were regarded as being of diagnostic significance were:—(1) a discrete papular rash present from the onset, abundant on the lower extremities and face, slight on the shoulders, and absent from the trunk; it resembled the rash described as occurring in Shichito fever; (2) the complement-fixation reaction with antigen prepared from *R. tamiyai* was positive at a titre rising from 1 in 20 on the 7th day to 1 in 80 on the 24th day; (3) the Weil-Felix reaction with *Proteus OX2* was positive at 1 in 20 on the 7th day rising to 1 in 40 on the 10th day; with *Pr. OXK* it remained constant at 1 in 20 throughout the illness, and with *Pr. OX19* it was completely negative; (4) the absence of an eschar was regarded as differentiating the disease from tsutsugamushi fever [in mite-borne typhus in other parts of the world and in the boutonneuse type of tick typhus the presence or absence of the initial lesion is generally regarded as fortuitous]; (5) the fever and symptoms disappeared promptly after the administration of chlortetracycline (aureomycin).

John W. D. Megaw

BANFIELD, A. W. F. **An Investigation of Ticks as Disease Vectors in Banff National Park, Alberta.** *Canadian J. Zool.* 1956, Oct., v. 34, No. 5, 417–23, 1 fig.

“A collection of 245 ticks (*Dermacentor andersoni*, Stiles, and *Dermacentor albipictus*, Packard) was made in the spring of 1953, from 17 localities in Banff National Park, Alberta. Laboratory tests indicated the presence of Colorado tick fever virus in three of 17 lots examined. One complement-fixation test was significantly positive for the Rocky Mountain spotted fever *Rickettsia* out of 19 tests. There was no indication of tularemia. One determination of the Q-fever virus was probably caused by laboratory contamination. The unfed adult ticks (*D. andersoni*) were found to be locally active from April 20 to June 22, 1953. The bighorn sheep (*Ovis canadensis*) was found to be the common local host of the adult tick. The Columbian ground squirrel (*Citellus columbianus*) was found to be the common host of the nymphs.”

SILVA-GOYTIA, R. & CALERO M., C. Estudios sobre fiebre Manchada, fiebre Q y tifo exantemático en el Istmo de Panamá. Incidencia de anticuerpos específicos para *Rickettsia rickettsi*, *Coxiella burnetti* y *Rickettsia prowazeki*, variedades *prowazeki* y *mooseri*, en grupos ocupacionales de diversas áreas geográficas. [**Studies in Rocky Mountain Spotted Fever, Q Fever and Exanthematic Typhus in the Isthmus of Panama**] *Archivos Med. Panamanoes*. 1956, Apr.–May–June, v. 5, No. 2, 99–106. [18 refs.] English summary.

Between August 1951 and March 1952 the authors carried out a serological and epidemiological study of rickettsial diseases in Panama [this *Bulletin*, 1952, v. 49, 1108].

They now record their results in terms of geographical areas, age and sex in 8 tables. Complement-fixation tests were carried out on 1,408 sera which had been negative in routine testing for syphilis.

Antibodies to *Rickettsia rickettsi* were found in 10 per cent. of sera, to *R. burneti* in 0.9 per cent. and to *R. prowazeki* in one case. The last named was the first case of epidemic typhus recorded in Panama, although *R. mooseri* infection has been found [*ibid.*, 1948, v. 45, 702].

The largest number of sera positive for *R. rickettsi* occurred in Coclé (15.2 per cent.) and the smallest in Bocas del Toro (5.4 per cent.). The incidence was greater in men.

The largest number positive for *R. burneti* occurred in Panama (2.1 per cent.) and negative results were recorded from 4 Provinces. The incidence was slightly greater in women.

The one case of *R. prowazeki* infection came from a suburb of Panama city.

H. J. O'D. Burke-Gaffney

RAŠKA, K., SYRŮČEK, L., SOBĚSLAVSKÝ, O., POKORNÝ, J., PRÍVORA, M., HAVLÍK, O., LÍM, D. & ZÁSTĚRA, M. Účast hlodavců v epizootologii Q-rickettsiosy. [**The Participation of Rodents in the Epizootology of Q Rickettsiosis**] Českoslov. Epidemiol., Mikrobiol., Imunol. Prague. 1956, v. 5, No. 5, 246-50. English summary.

In field investigations of Q fever carried out in 1954 in 2 widely separated areas in western and eastern Bohemia complement-fixing antibody was found in the sera of 30 of 574 rodents, including 14 of 169 *Mus musculus*, 11 of 220 *Apodemus flavicollis* and *sylvaticus*, 1 of 90 *Microtus arvalis*, 2 of 67 *Clethrionomys glareolus*, 1 of 6 *Arvicola terrestris* and 1 of 13 *Lepus europaeus*. Antibody was also found in 41 of 339 rats (*Rattus norvegicus*) caught in the same areas and also in 5 other urban and rural areas in Bohemia. Sera from 129 insectivores (*Sorex araneus*, *S. minutus*, *Neomys fodiens*, *N. anomalus*, *Talpa europea*) caught in the first 2 areas were all negative. Attempts to isolate *R. burneti* from 7 species of rodents were successful in 4 of 79 instances, the organisms being found in 1 *Rattus norvegicus*, 2 *Mus musculus* and 1 *Clethrionomys glareolus*.

D. J. Bauer

LIKAR, M. Izolacija rikecije burneti iz kozjega mleka. [**The Isolation of *R. burneti* from Goat's Milk**] Zdravstveni Vestnik. Ljubljana. 1955, v. 24, Nos. 5/6, 216-17, 1 graph & 1 fig.

The English summary appended to the paper is as follows:—

"A successful attempt to isolate *R. burneti* from goats milk is described. Author considers isolation of *R. burneti* from infected material as a simple method as guinea pigs are highly sensitive and very suitable animals for this purpose. Isolated strain is the first strain isolated in Jugoslavia from milk."

MORELJ, M. & GERBEC, M. Q-groznica: Ispitivanje imunogenih osobina soja "Piro". [**Q-Fever: Examination of Immunogenic Characters of the Strain "Piro"**] *Higijena*. Belgrade. 1956, v. 8, No. 1. 25-38. [33 refs.]

The authors have investigated the antigenic relationships of the Piro strain of *Rickettsia burneti*, isolated in 1954 from stable dust during the course of an epidemic of Q fever in a barracks in Yugoslavia. A close relation to the Henzerling strain was demonstrated in reciprocal cross-protection tests in guineapigs. After 11 passages in the yolk sac the Piro strain yielded a satisfactory complement-fixing antigen, which gave titres of the same order as the Henzerling and Nine-Mile strains in parallel titrations of 14 human and 24 animal immune sera. *D. J. Bauer*

BREZINA, R. Príspevok k štúdiu rozpustného antigénu *C. burneti*. Zdelenie I: Rozpustný antigén v sérologických reakciách a v imunitě proti Q horúčke. [**A Contribution to the Study of the Soluble Antigen of *C. burneti*. I: Soluble Antigen in Serological Reactions and in Immunity against Q Fever**] *Českoslov. Epidemiol., Mikrobiol., Imunol.* Prague. 1956, v. 5, No. 5, 239-45, 1 graph. [11 refs.] German summary.

Sediment obtained by centrifugation from a 20 per cent. suspension of yolk sacs heavily infected with *Rickettsia burneti* was resuspended in one-quarter volume of saline containing 0.2 per cent. formaldehyde and extracted with  $1\frac{1}{2}$  volumes of ether for 18 hours at 4°C. The aqueous layer obtained by high-speed centrifugation showed no antigenic properties in complement-fixation tests with a Q fever immune serum, but specific fixation was obtained after the crude antigen had been concentrated 20 times by precipitation with 25 per cent. ethanol. The mean duration of fever in guineapigs after infection with a standard dose of *R. burneti* was reduced from 5.2 days in 8 untreated animals to 2.3 days in 10 guineapigs which had been immunized with 3 doses of 2 cc. of crude soluble antigen at intervals of 7 days. In a further group of 5 guineapigs similarly immunized with antigen concentrated 20-fold by precipitation with ammonium sulphate the mean duration of fever was reduced to 0.4 day. Soluble antigens obtained from 5 other strains of *R. burneti* showed similar immunizing power, and treated animals developed complement-fixing and agglutinating antibodies. *D. J. Bauer*

ARMAND, P. & SENDRAL, R. Sur neuf cas de Q Fever observés à Fès. [**Nine Cases of Q Fever in Fès, Morocco**] *Maroc. Méd.* 1956, Oct., v. 35, No. 377, 968-9.



## DENGUE AND ALLIED FEVERS

HOTTA, S. & EVANS, C. A. **Cultivation of Type 2 Dengue Virus in Rhesus Kidney Tissue Culture.** *Proc. Soc. Exper. Biol. & Med.* 1956, Oct., v. 93, No. 1, 153-5.

Type 2 dengue virus (New Guinea C strain) was transmitted serially in trypsinized rhesus kidney tissue cultures for 18 passages during 176 days with retention of mouse infectivity and sensitivity to neutralization by homologous and not by heterologous serum. Infected culture cells showed characteristic degeneration indistinguishable from that produced by type 1 dengue virus. [See also this *Bulletin*, 1956, v. 53, 986.]

R. S. F. Hennessey

REAGAN, R. L., YANCEY, Frances S. & BRUECKNER, A. L. **Studies of Dengue Fever Virus (Hawaii Mouse adapted) in Lactating Hamsters.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 809-11.

"From this observation it appears that dengue fever virus (Hawaii mouse adapted) may be transmitted from lactating hamsters to suckling hamsters. None of the mothers showed symptoms of nervous system involvement over a 21 day observation period. Mouse tests of their brains were negative. Four out of 32 suckling hamsters developed symptoms of nervous system involvement and their brains were shown to contain dengue fever virus by neutralization tests conducted intracerebrally in Swiss albino mice. The control sucklings and sucklings from the exposed mothers showing no signs of central nervous system involvement were sacrificed and their brains tested by the intracerebral mouse test, but no virus was demonstrated."

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## RABIES

SOURANDER, P. **Cytochemical Studies on Rabies Inclusions (Negri Bodies).** *J. Path. & Bact.* 1956, July, v. 72, No. 1, 257-65, 12 figs. on 2 pls. [37 refs.]

The composition of Negri bodies has been investigated by means of an elegant combination of refined physical and cytochemical techniques. Sections of cerebellum and hippocampus of 2 dogs infected with a street strain of rabies virus were examined by X-ray microradiography, a method which enables the mass of protein in selected areas of cytoplasm to be determined from the amount of radiation which they absorb. The dry weight of 5 Negri bodies as determined by this method ranged from 0.29 to  $0.38 \times 10^{-9}$  mgm./ $\mu^3$ , compared with 0.17 to 34 for 5 determinations on

the surrounding cytoplasm. In cells photographed by ultraviolet light at 2,570Å the Negri bodies were often obscured by strong cytoplasmic absorption; when this was removed by incubation with ribonuclease the bodies became more distinct, and appeared unaffected by the treatment. No change in the absorption of the bodies occurred after fixation and incubation with deoxyribonuclease. It is concluded that Negri bodies contain 50 per cent. more dry substance than the surrounding cytoplasm and that nucleic acids of either type are absent; the bodies are therefore unlikely to contain virus and probably represent a cytoplasmic reaction to infection.

D. J. Bauer

MÜLLER, G. L'attività dell'Istituto Antirabbico di Ancona nel trentennio 1924-1953. [**Activity of the Anti-Rabies Institute at Ancona in 1924-1953**] *Riv. Italiana d'Igiene*. 1955, July-Aug., v. 15, Nos. 7/8. 277-82.

ROLLINSON, D. H. L. **Problems of Rabies Control in Africa.** *Bull. Epizootic Dis. of Africa*. 1956, June, v. 4, Nos. 1/2, 7-16. [25 refs.]

The author gives a brief history of the disease and its occurrence in Africa and draws attention to the various species of animals which may be affected.

The wild fauna are of special importance and in this connexion Game Reserves may act as important reservoirs of the virus. Control measures under African conditions are difficult and involve destruction of the vectors, which is only partially efficient.

Control of domestic dogs which includes registration and vaccination is essential to success.

J. Carmichael

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## PLAGUE

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.*

BURROWS, T. W. & BACON, G. A. **The Basis of Virulence in *Pasteurella pestis*: an Antigen determining Virulence.** *Brit. J. Exper. Path.* 1956, Oct., v. 37, No. 5, 481-93, 2 figs. (1 on pl.). [13 refs.]

Suspensions of virulent *Pasteurella pestis* were rendered highly sensitive to phagocytosis by treatment with antisera prepared against avirulent and virulent strains of plague bacilli. The property of conferring sensitivity was not correlated with the amount of antibody to fraction 1

(envelope or capsule) antigen present in antisera. Antigenic analyses of vaccines by the agar diffusion precipitation technique showed that strains of plague bacilli without visible capsulation, which were able to develop resistance to phagocytosis, produced 2 antigens which were not produced by strains unable to develop resistance. All virulent strains examined had the capacity to elaborate these antigens, the majority of virulent strains failing to do so.

It is considered that high virulence requires the presence of one or both of these antigens in addition to fraction 1 antigen. As one avirulent strain (EV76) was able to develop resistance to phagocytosis although possessing all 3 antigens, it was apparent that at least one other determinant of virulence must exist.

R. S. F. Hennessey

KARTMAN, L., QUAN, S. F. & McMANUS, A. G. **Studies on *Pasteurella pestis* in Fleas. IV. Experimental Blocking of *Xenopsylla vexabilis hawaiiensis* and *Xenopsylla cheopis* with an Avirulent Strain.** *Exper. Parasit.* New York. 1956, Sept., v. 5, No. 5, 435-40, 2 figs.

The blocking of *Xenopsylla cheopis* with the avirulent strain A1122 of *P. pestis* has already been reported by the authors [see this *Bulletin*, 1955, v. 52, 534]. In the present paper they describe investigations with the same strain on the proventricular blocking rate in both sexes of *X. vexabilis hawaiiensis* compared with male *X. cheopis*. Fleas were infected by the artificial feeding technique previously used, infecting dosage being at the rate of  $2.4 \times 10^9$  *P. pestis* per ml. in rat blood. After feeding, fully blooded fleas were maintained separately on young rats at 21°C. to 24°C. and 50 to 56 per cent. relative humidity.

Blood-agar culture of triturated fleas at various intervals showed an initial decline in bacterial counts for males of both species, followed by an increase after about 48 hours; the increase was much more marked in male *X. v. hawaiiensis* than in male *X. cheopis*, and a similar increase was found in female as in male *X. v. hawaiiensis*. Counts in males of both species declined after 5 days, and in female *X. v. hawaiiensis* after 10 days.

Mean infection rates were similar at 70.5 and 76.0 per cent. in *X. v. hawaiiensis* and *X. cheopis* respectively, but individual infection rates were 90.0 per cent. for male, and 58.0 per cent. for female *X. v. hawaiiensis*. The mean blockage rate (both sexes) was 36.1 per cent. in *X. v. hawaiiensis* and 52.6 per cent. in *X. cheopis*; all blocked fleas were confirmed 100 per cent. plague positive. Fleas with masses comprised 69.4 per cent. (68.0 per cent. plague positive) for combined sexes of *X. v. hawaiiensis*, and 57.8 per cent. (63.6 per cent. plague positive) for *X. cheopis*.

Blocking rate-time curves were similar in males of the two species, *X. v. hawaiiensis* being the steeper; the curve for female *X. v. hawaiiensis* was much more gradual, especially in comparison with males of the same species. This resulted in recovery of 52.5 per cent. of *X. v. hawaiiensis*



females after 30 days, compared with 24.2 per cent. of *X. cheopis* after the same period, and only 21.7 per cent. of male *X. v. hawaiiensis* after 15 days.

N. R. Phillips

SUYEMOTO, W., WHEELER, C. M., CAVANAUGH, D. C., YAMAKAWA, Y. & SHIMADA, T. **Studies on *Pasteurella pestis* in Various Flea Species.**

**III. Transmission of Avirulent Strains of *Past. pestis* by *Xenopsylla cheopis*.** *J. Infect. Dis.* 1956, July-Aug., v. 99, No. 1, 72-5.

This is the first recorded account in which experimental transmission of an avirulent strain of *Pasteurella pestis* has been achieved. The material used consisted of strain A1122 of *P. pestis*, previously known to cause proventricular blockage in *Xenopsylla cheopis* [this *Bulletin*, 1955, v. 52, 534], and two strains of the vector, derived from California and Kobe, Japan, respectively.

Preliminary experiments to determine infection rate, blockage and survival were made by feeding fleas artificially, with subsequent maintenance (1) under optimum conditions in test tubes for 96 hours (2) continuously on mice for 120 hours (3) periodically (once daily) exposed to mice during 120 hours. After 3 to 6 days, gastrointestinal blockage was present in 23 of 62 (37 per cent.) fleas in group (1), 5 of 28 (17.8 per cent.) in group (2) and 7 of 48 (14.6 per cent.) in group (3), as judged by visual examination with or without dissection followed by bacteriological culture of the gut contents.

In qualitative transmission experiments, groups of starved fleas were artificially fed at concentrations from  $725 \times 10^7$  to  $109 \times 10^8$  viable *P. pestis* per ml. of blood, and those which appeared to be blocked after 3 to 6 days (visual examination, and cultural confirmation for representative samples) were retained. Further samples were cultured after various intervals during the experiments. Avirulent *P. pestis* was recovered from the spleens of mice between the 12th and 24th days after exposure to blocked fleas, but no deaths were attributable to acute plague infection.

Results indicated that the proportion of blocked fleas was less in comparison with other published and comparable proportions obtained with virulent strains of *P. pestis* [*ibid.*, 1946, v. 43, 35]; the authors consider that the virulence of the strain employed here was not increased.

[For parts I and II of these studies, see this *Bulletin*, 1956, v. 53, 990, 991.]

N. R. Phillips

HOLDENRIED, R. & QUAN, S. F. **Susceptibility of New Mexico Rodents to Experimental Plague.** *Pub. Health Rep.* Wash. 1956, Oct., v. 71, No. 10, 979-84, 1 map. [15 refs.]

"A total of 398 wild rodents of 21 species were inoculated intracutaneously with 0.05 ml. of aqueous suspensions containing various

numbers of *Pasteurella pestis* (Alexander strain, New Mexico) to test their susceptibility to plague infection in comparison with white laboratory mice inoculated identically.

"The wild rodent species ranged in susceptibility from homogeneous sensitivity equal to that of the control mice to complete resistance.

"The majority of the rodents that survived plague inoculation, regardless of species, died of toxemia after receiving about 650 LD<sub>50</sub> of plague toxins intraperitoneally.

"The comparison of four species, *Neotoma albigula albigula*, *Peromyscus truei truei*, *Peromyscus leucopus tornillo*, and *Peromyscus maniculatus rufinus*, trapped in an area where plague was found with those collected from a plague-free area, demonstrated no differences in susceptibility to experimental *P. pestis* infection.

"Since the available number of animals of any one species tested was small, such factors as sex and age could not be evaluated.

"The possible effect of seasons on the susceptibility of the rodents was not investigated. The persistence of plague in the area where it occurred was not determined."

SCHULZ, K. H. & CRUTKHOW, C. **A Demonstration Project of Plague Control in a South-East Asian Township in 1950.** *J. Trop. Med. & Hyg.* 1956, Nov., v. 59, No. 11, 267-9.

An opportunity of demonstrating anti-plague measures to sanitary inspectors in Chiangmai, Thailand, was afforded by the occurrence of plague 120 km. distant. Areas of the town were each dealt with by a supervisor and 2 labourers. Patch dusting was carried out with 5 per cent. DDT (1 part 50 per cent. wettable powder with 10 parts rice talc) around rat holes and along runways; dusters improvised from biscuit tins (12" x 4") with pierced bottoms were used. Blowers were used to dust inaccessible points. Flea control by this means was followed by a rat poisoning campaign with arsenic trioxide 1 part, with 3 parts starch and 2 parts powdered fish. The poisoned bait was made up in pellets of about 2 gm. weight and 63 per cent. of the baits were taken. Subsequently 200 break-back traps were put down, baited with dried fish, over 15 nights to test the efficacy of the poisoning campaign. The only rats seen were *Rattus rattus* and infestation was patchy. In the exercise 1,241 structures were dusted, 500 rats were collected after poisoning and 998 trapped.

It is interesting to note the use of an edible diluent for the DDT, which attracted the rats and demonstrated their tracks, thus allowing rat control measures to be used in known infested foci.

T. H. Davey

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## CHOLERA

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

BLASS, Judith. Sur les constituants azotés des phosphatides du vibron cholérique. [**Nitrogenous Constituents of Phosphatides of *Vibrio cholerae***] *Bull. Soc. Chimie Biol.* 1956, v. 38, No. 11, 1305–14, 1 fig. [21 refs.]

LOWENTHAL, J. P. **Stability of a Fluid Cholera Mucinas Preparation when combined with a Commercially Prepared Cholera Vaccine.** *Proc. Soc. Exper. Biol. & Med.* 1956, Oct., v. 93, No. 1, 103–6.

Although various investigators have suggested that the mucinase of *Vibrio cholerae* may be involved in the pathogenesis of Asiatic cholera [this *Bulletin*, 1956, v. 53, 749], previous culture-filtrate preparations of the enzyme were so sensitive to heat, storage, and chemicals [*ibid.*, 1954, v. 51, 176] that the immunizing property of this mucinase seemed worthless. The present study concerns the stability of a combined cholera mucinase-vaccine preparation.

The culture used for preparation of the mucinase was *V. comma* strain 20A78, obtained from Jefferson Medical College, Philadelphia. Growth of the organism in brain-heart infusion broth gave good mucinase titres. The mucinase was purified by half-saturation of the culture filtrate with  $(\text{NH}_4)_2\text{SO}_4$ , solution of the resulting sediment in borate-buffered calcium saline, dialysis of the solution against buffered saline until the dialysate no longer precipitated with  $\text{CaCl}_2$ , and sterilization by filtration through a Selas filter. Estimation of mucinase activity was based on the ability of the mucinase to depolymerize ovomucin so that the latter was no longer clotted by cetyl trimethyl ammonium bromide. The purified preparation contained 2,048 mucinase units per ml. compared with 64 units per ml. of the original culture filtrate. Moreover, the purified preparation retained full *in vitro* enzymatic activity for  $2\frac{1}{2}$  years.

The antigenic properties of the mucinase solution alone, the cholera vaccine alone, and a mixed preparation of cholera mucinase-vaccine were investigated by intravenous injections of these 3 preparations into rabbits, and subsequent assay of the sera for agglutinin and antimucinas activity. The combined preparation gave rise to as high titres for both agglutinin and antimucinas as did the separate components. The authors suggest that the combined cholera mucinase-vaccine preparation might have certain advantages as an immunizing agent for Asiatic cholera.

Constance A. C. Ross



## AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

CHANG, S. L. & KABLER, P. W. **Detection of Cysts of *Entamoeba histolytica* in Tap Water by the Use of Membrane Filter.** *Amer. J. Hyg.* 1956, Sept., v. 64, No. 2, 170–80. [18 refs.]

The authors found that membrane filtration is an efficient method for the isolation of cysts of *Entamoeba histolytica* from water. With samples having a probable cyst density as low as 5 per gallon, with 5 membranes to filter 5 gallons of water, the probability of obtaining at least one positive result out of 5 on cultivation was 94 per cent.

The method is to be adopted for routine detection of cysts of *E. histolytica* in water during known or suspected waterborne amoebiasis. A list of precautions to be observed relating to technique is set out.

Incidentally, during the course of these experiments it was demonstrated that free chlorine in concentrations between 1.8 and 2.4 parts per million at pH 8.4 and room temperature exerted no detectable harmful effect on the cysts during contact periods up to 100 minutes.

*E. Windle Taylor*

NAKAMURA, M. & BAKER, E. E. **Effect of Antimetabolites on Growth of *Entamoeba histolytica*. II. Pantetheine and Coenzyme A Antagonist.** *Proc. Soc. Exper. Biol. & Med.* 1956, Aug.–Sept., v. 92, No. 4, 723–5.

Reports on the growth factors required by *E. histolytica* have appeared earlier [this *Bulletin*, 1953, v. 50, 707; 1956, v. 53, 318; 1957, v. 54, 40], among them was coenzyme A. Certain purine and pyrimidine analogues have been found to inhibit the growth of this parasite. KUN *et al.* [*ibid.*, 1956, v. 53, 184] also described some metabolic inhibitors which interfered with CO<sub>2</sub> and H<sub>2</sub>S production by *E. histolytica*.

The effect of a coenzyme A antagonist, namely bis-N-pantoyl- $\beta$ -aminoethyl disulphide (PAED) on the metabolism of the amoeba has now been studied in order to confirm the role of coenzyme A as a growth factor. Cultures of the parasite were rendered free of viable bacteria by means of penicillin and streptomycin in a medium of serum-Ringer overlay on egg slants, in which sodium thioglycollate, dextrose and rice starch were present. In addition, adenosine-triphosphate and ribose-5-phosphate were sometimes added when the role of PAED as antagonist was being studied. Under these conditions PAED was able to inhibit growth of *E. histolytica* at a dilution of 1 in 50,000. This effect was reversed by pantetheine from which coenzyme A may be synthesized, also by coenzyme A itself or by the presence of live bacteria, but not by

pantothenic acid. These results suggested to the authors that PAED is acting as an antimetabolite, thus confirming the importance of coenzyme A in the nutrition of *E. histolytica*.

J. D. Fulton

NAKAMURA, M. **Amoebicidal Action of Azaserine.** [Correspondence.] *Nature*. 1956, Nov. 17, v. 178, 1119-20.

Azaserine, which is formed by *Streptomyces* in nature is O-diazoacetyl-L-serine ( $\text{N}_2\text{CH.CO.O.CH}_2\text{.CH(NH}_2\text{).COOH}$ ). It has been reported to cause inhibition of tumour growth and to possess a wide antibacterial spectrum. It also interferes with the incorporation of certain structures into nucleic acids. The author has now investigated its activity against *E. histolytica* in bacteria-free cultures under the conditions described by him [this *Bulletin*, 1956, v. 53, 318]. It proved to be amoebicidal at dilutions of 1 in 10,000 to 1 in 20,000. The inhibitory effect was reversed by adenine, adenylic acid and 2,6-diaminopurine. Other substances and certain purine derivatives had no inhibitory properties. The author concluded from his results that azaserine acts as an antimetabolite in the biosynthesis of purines. However, a derivative of *nor*-leucine, also a tumour-inhibiting substance, which is reputed to interfere with biosynthesis of nucleic acids, did not affect *E. histolytica*.

J. D. Fulton

CAMERON, I. G. **A Case of Amoebic Dysentery with Concomitant Symptomatic Purpura.** *East African Med. J.* 1956, Oct., v. 33, No. 10, 401-2.

"A case of amoebic dysentery with concomitant purpura is reported. The purpura disappeared *pari passu* with treatment of the dysentery. Apparently the purpura had been caused by the dysenteric infection. I have been unable to trace any previous report of amoebiasis associated with symptomatic purpura."

ANDRÉ, M. F. **Amibiase chirurgicale et allergie. Du rôle de la flore microbienne associée dans les formes extrêmes de la maladie. (A propos de constatations récentes faites au Sud-Vietnam.) [Surgical Amoebiasis and Allergy. Role of Associated Bacterial Flora in Extreme Forms of the Disease]** *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3, 508-25. [10 refs.]

In less than 2 months during 1953 "hyperacute" hepatocolic amoebiasis was responsible for the deaths of 7 Europeans in Saigon, and 2 more died shortly thereafter. All suffered from extensive and diffuse gangrenous lesions; these in some cases were confined to the liver, but in others they involved both the liver and the colon. The onset of amoebiasis in these cases was not of unusual severity, and in this respect

the condition did not conform to the "fulminating" type much earlier described by ROGERS in India. Blood culture and cultures of aspirated material failed to yield contaminant organisms in most of these cases. None of them had been treated with emetine, but most of them had had treatment with the soluble iodides, then in vogue. When the use of emetine was re-introduced hyperacute amoebiasis immediately disappeared. Emetine, as has previously been advocated by French workers, should be given in association with antibiotics.

The author analyses at some length the outbreaks of hyperacute amoebiasis in Cochin-China; he also has obtained data relative to the treatment of a series of 409 cases of surgical amoebiasis dealt with by military surgeons in the area. From the information available to him, he postulates that strains of amoebae differ but little in their potential pathogenicity; but the associated bacterial flora are variable and unstable. It is the nature of the latter and the toxins they produce that determines the clinical progress of the disease and the kind of lesions produced.

A. R. D. Adams

ANDRÉ, M. F. Les formes suraiguës de l'amibiase hépatique en Indo-chine. Leurs aspects cliniques, anatomiques et bactériologiques (à propos de 37 observations). [**Clinical Anatomical and Bacteriological Aspects of 37 Cases of Fulminant Hepatic Amoebiasis in Indo-China**] *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3, 494-508, 5 figs. on 4 pls.

The author enlarges on the fulminant form of amoebiasis, of which he has previously recorded 12 cases in Indo-China [see this *Bulletin*, 1956, v. 53, 187]. Enquiry has disclosed another 28 cases among the French Expeditionary Force in Indo-China between 1949 and 1955, and 9 additional cases have also been seen. This series of 37 cases accounts for 9 per cent. of the surgical hepatic amoebiasis seen in the country during the last 6 years. The mortality in the series was 86.5 per cent., and so survival was unusual. An attempt is made to subdivide the cases of the series into groups according to their presenting symptoms, the anatomical sites of the major lesions, and the results of laboratory diagnosis.

The text does not lend itself to summary and the paper should be consulted in the original by those interested.

A. R. D. Adams

CARAYON, A., HERVÉ, A., GAILLARD, F. & COYNE, F. Les occlusions intestinales aiguës par amœbome. (A propos de 6 observations personnelles.) [**Intestinal Obstruction caused by Amoebomata. An Account of 6 Cases**] *Méd. Trop.* Marseilles. 1956, Sept.-Oct., v. 16, No. 5, 663-76, 6 figs. [33 refs.]

Among the various surgical complications of intestinal amoebiasis obstruction is important, both by reason of its gravity and the complex



pathological conditions involved. Obstruction may be due to (a) spasm or (b) organic obstruction, either extra-intestinal from inflammation, abscess or tumour, or intestinal from stricture or intussusception. Spasm may cause partial obstruction where there is narrowing of the colon, simulating neoplasm, a syndrome stated to be rare in amoebiasis, of which the authors have seen several examples. The term *amoeboma* is applied to inflammatory tumours of the colon of amoebic origin, of which the authors distinguish two varieties:—(1) the *true amoeboma* is a fibro-lipomatous tumour involving the whole thickness of the intestinal wall, which is thickened, oedematous, hard and nodular; these lesions are chronic from the start, fibrous, partly irreversible and are less responsive to specific treatment; (2) *inflammatory amoeboma* is an ulcer of the mucosa, penetrating deeply and forming an abscess communicating with the intestinal lumen by a short fistulous tract and surrounded by an intense inflammatory reaction responding in a spectacular fashion to specific treatment. In both types the lymph nodes along the colic vessels are enlarged. Microscopically in both types the appearances are those of a parasitic granuloma, but amoebae are not often found in the sections. Complications which may occur are: (1) the ulcer may act as an irritant and set up a spasm, with vasomotor disorder, which may be the starting point of an intestinal invagination, or amoebiasis may set up a persistent focus of acute or chronic inflammation; (2) a tumour may itself obstruct the intestine or may do so indirectly by causing oedema or spasm, or thickening of the bowel wall may lead to adhesions, kinking or volvulus, or a fistula with a pericolic abscess may form leading to paralytic ileus or to adhesions strangling a loop of gut, or causing a volvulus.

Clinical details are given of 6 cases illustrating these complications: (1) obstruction of the large bowel due to an abscess around an amoeboma in the sigmoid colon; (2) obstruction by an amoeboma of the caecum; (3) obstruction by an ileo-caecal-colic invagination of a thickened caecum and appendix into the ascending colon as far as the hepatic flexure; after reduction, *E. histolytica* was subsequently found in the stools; (4) obstruction by a volvulus of the small intestine, due to amoebic thickening of the transverse colon, to which the small intestine was adherent with an abscess between; this was reduced and a hemicolectomy performed; the patient died; (5) obstruction due to volvulus of the caecum, in which there was a large amoeboma; (6) obstruction due to volvulus of the sigmoid, in which there was an amoeboma; reduction of this was obtained and an artificial anus made as far as possible above the amoeboma; death occurred 3 days later. The 4 patients who survived were treated by courses of emetine and antibiotics.

After discussing the differential diagnosis at operation between cancer of the bowel and amoeboma, the authors advise that treatment of the latter should be conservative where possible—closure of the abdomen, emetine and antibiotics. Surgical excision, however, is indicated in cases

of intestinal fistula or perforation, or where an intussusception or volvulus cannot be reduced. There are 6 line drawings which show very clearly the conditions described in the case histories. W. L. Harnett

VAN ASSENDELFT, F., MILLER, J. W., MINTZ, D. T., SCHACK, J. A., OTTOLENGHI, P. & MOST, H. **The Use of Glaucarubin (a Crystalline Glycoside isolated from *Simarouba glauca*) in the Treatment of Human Colonic Amebiasis.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 501-3.

A series of 113 patients aged from 2 to 42 with "asymptomatic to moderate colonic amebiasis" who had cysts with or without trophozoites of *E. histolytica* in their stools, were treated with Glaucarubin [this *Bulletin*, 1956, v. 53, 995], with various dose ranges of the glucoside. Eleven failures were reported in 41 patients receiving 5 mgm. or more per kgm. for 10 days. Follow up averaged 2.6 stools in a period of 82 days.

The drug was well tolerated. Treatment was stopped in two patients who vomited and in one in whom the white cell count was low on the fourth day (the count was normal 6 days later).

[The paper is deficient in details, especially with regard to follow up, which appears to have been inadequate.] B. G. Maegraith

MINTZ, D. T., MILLER, J. W., OTTOLENGHI, P., SCHACK, J., VAN ASSENDELFT, F. & MOST, H. **RO 2-1160, a New Drug for the Treatment of Amebiasis.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 497-500.

This new drug is a pentavalent aromatic stibonic acid (2-carboxy-methyl-mercapto-benzine stibonic acid) found to possess significant activity against experimental *Entamoeba histolytica* infections in rats.

The drug was administered orally to one group of patients with proved amoebiasis in doses of 25 mgm./kgm. body weight for 5 days and to another group the same daily dosage was continued for 10 days. The patients were mostly Puerto Ricans and 195 were treated. In the combined series the stools of 77 per cent. became and remained free from the infection, as judged by a follow-up in which an average of 3 stools per patient were examined over periods varying from 1 to 360 days: 20 patients were followed up for 30 days or less and 31 for 181 to 360 days.

Most patients before treatment exhibited few or no symptoms but in 16 with clinical evidence of moderately severe disease there was rapid clinical improvement. Among the 36 patients receiving the higher dosage of the drug, 6 complained of nausea and vomiting and one of diarrhoea. In 4 of the 6 patients exhibiting drug intolerance, symptoms began after the first few doses had been given and necessitated discontinuance of

treatment. "An additional 11 hospitalized patients not followed after treatment consisting of the administration of 25 mg./kg. of drug for 10 consecutive days showed no evidence of hematologic, urinary or hepatic toxicity during or after treatment."

A. W. Woodruff

POWELL, Elinor D. U. **Giardiasis.** *Irish J. Med. Sci.* 1956, Nov., 6th ser., No. 371, 509-17. [28 refs.]

The author, from Dublin, discusses the literature of giardiasis, with special reference to the possible pathogenicity. Only 2 cases in which this parasite was found have been recorded hitherto in Ireland [this *Bulletin*, 1941, v. 38, 274; 1942, v. 39, 692]. She then records 28 cases of infection with *Giardia* seen in Dublin. Very full examinations were carried out to investigate the condition and to exclude other causes for it. With these features, readers of this *Bulletin* will be familiar. The special interest of this work, however, lies in the finding of the parasite in 20 children admitted to the National Children's Hospital in Dublin with diarrhoea and steatorrhoea, and in 8 other children. The 20 children were aged 1 to 11 years, and in all but 2 symptoms had appeared before the first birthday: the duration of symptoms varied from 10 days to 11 years, but usually was less than 1 year.

In 5 of 8 of the families which could be investigated, a sibling was also found to harbour *Giardia* and in 100 hospital patients between 1 and 14 years, mostly from surgical wards, 3 other infections were found: in this group patients admitted for diarrhoea or steatorrhoea had been excluded. Hence in 8 of the 28 children infected the condition was entirely "silent" and it is suggested that there are carriers of *Giardia* among other children in Ireland. Reasons are given for deducing that the symptoms in the other 20 children were due to the presence of the parasite. In all these patients, mepacrine removed the parasite and in all but 2 bowel symptoms ceased immediately. It is concluded that in some persons the parasite may cause severe intestinal disease and in others the condition may be entirely symptomless.

H. J. O'D. Burke-Gaffney

GONDARD, L. Les conditions à observer pour le diagnostic parasitologique de la lambliaose et le contrôle de sa guérison. [**Necessary Conditions for Parasitological Diagnosis of *Giardia* Infection and for Determination of Cure**] *Montpellier Méd.* 1956, Apr., v. 49, No. 4, 365-71.

The presence of *Giardia* in the bile or in the stools is not proof that it is the cause of symptoms from which a patient may suffer. A diarrhoea ascribable to this parasite should stop within 2 or 3 days of effective treatment of the infection. The best form of treatment is with a combination of mepacrine and Rodopréquine [see this *Bulletin*, 1953, v. 50, 626], which originally was known as Prémaline. Only the disappearance both



of the parasite and of the symptoms justifies a diagnosis of symptomatic giardiasis.

*Giardia* should be sought in the elective habitat of the parasites, the bile. They infest the biliary passages both within and outside the liver, and may in some cases exclusively be confined here. Usually, however, they are rhythmically discharged into the small intestine and infect this also, and even the colon. In some fasting subjects they are scanty in the duodenum, as judged by examination of material obtained by a duodenal tube; in others they are plentiful. In the former case they appear after a stimulation of bile excretion.

While the vegetative forms are constantly present in the bile the cysts are discharged only irregularly in the stools, and they may be absent from them for some days. A properly performed examination of the bile therefore will always reveal the presence of the parasites, but isolated or even continuous stool examinations are unreliable.

Lysis of the parasites is prone to occur in bile specimens; they therefore should be preserved in formalin or a similar fixative. The specimens are collected from the duodenum before the secretion of bile begins, and in fractions thereafter. Mucous flakes should be picked out and searched; the remainder of the specimen is centrifuged and at least 300 microscope fields of the deposit must be examined before the specimen is reported as free from parasites. After treatment re-examination should be made for some weeks or months to confirm cure. This is because though the vegetative forms may have disappeared as a result of the treatment, cysts in the gall bladder can hatch and re-establish the infection.

A. R. D. Adams

JEFFERY, G. M. **Human Coccidiosis in South Carolina.** *J. Parasitology*. 1956, Oct., v. 42, No. 5, 491-5.

"Four cases of *Isoospora belli* infection were detected in a school for mental defectives. These are the first indigenous cases known to occur in South Carolina.

"A fifth case occurred in a technician, possibly accidentally acquired in the laboratory. Symptoms attributable to the *Isoospora* infection in this case are described.

"Oocysts persisted in the stools of 3 of the institutionalized cases for 83, 115, and 120 days after their detection, and for 50 days in the laboratory technician.

"Experimental inoculation, with mature oocysts, of 2 monkeys, 2 dogs, 2 swine, 12 mice, 4 rats, a guinea pig, and a rabbit failed to produce discernible infections."

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## RELAPSING FEVER AND OTHER SPIROCHAETOSSES

MARTINI, E. Zur älteren Geschichte der Recurrens im europäischen Raum. [**The Ancient History of Relapsing Fever in Europe**] *Ergebn. Hyg. Bakt. Immunitätsf.* 1955, v. 29, 213-47. [Numerous refs.]

The author gives a detailed historical account. The chapter dealing with the prevalence of relapsing fever in Europe up to the First World War contains references to the epidemics in Ireland and Scotland during the eighteenth century and first half of the nineteenth century, and it is suggested that the British Isles remained a possible focus of infection for Belgium and North America until the disappearance of the disease towards the end of last century. Relapsing fever persisted on the Continent much later, and the author traces various epidemics from one recorded by Hippocrates in the island of Thasos about 2,000 years ago down to those occurring during the First World War. [The article should be consulted in the original by those interested in the subject.]

Edward Hindle

## YAWS AND OTHER TREPONEMATOSSES

HASSELMANN, C. M. Studien über die Histopathologie von Pinta, Frambösie und Syphilis. [**Histopathology of Pinta, Yaws and Syphilis**] Reprinted from *Arch. f. Klin. u. Exper. Dermat.* 1955, v. 201, 1-8, 8 figs. [17 refs.]

In comparing the initial and secondary generalized lesions of pinta and yaws the author states that the former are never moist and the epithelium is invariably intact, whereas the latter may become moist and the epithelium may erode and become papillomatous. Pinta lesions are never necrotic. Yaws lesions may become necrotic in the latest stages and ulceration, tissue destruction and scarring result. Allergic reactions may be concerned in the break-down of the yaws lesions. The primary chancre and later lesions of syphilis are different in their clinical and histological patterns from those of both pinta and yaws, especially in regard to the damage to the intima and media of the blood vessels.

The earliest pinta papule begins with acanthosis and a diffuse infiltration with round cells of subepithelial tissues and the *rete malpighii*. The involvement of the epidermis never reaches the "intradermal abscess" stage typical of the much more severe process seen in the initial and secondary lesions of yaws. The blood vessels and lymphatics are dilated but the intima and media of the vessel walls are not affected even in long-standing lesions. In both pinta and yaws the endarteritis obliterans characteristic of syphilis is never seen. Occasionally, however, there is some minor swelling of the endothelial nuclei associated with the intense connective tissue changes which develop. In later pintids a

hyperkeratosis may develop which, with the coexisting local oedema of the cutis, leads to pressure atrophy and flattening of the *rete malpighii*. Infiltration in the corium is diffuse. In the deeper cutis perivascular nodulation develops.

In the secondary pintid the localization of the infiltration (often rich in plasma cells) about the vessels in the cutis is characteristic. The elastic tissue is rarefied and stretched.

In later lesions the inflammatory changes recede, pigment is reduced or atrophied and may collect and clump in the deep cutis. In this stage depigmented leucodermic areas coexist with blue red or copper coloured lesions.

Eventually there may be accumulations of epithelioid cells, but even in this stage there is no change in the blood vessel walls in pinta. The same is true in jaws lesions. Both contrast in this respect with the picture in syphilis in which the vessel walls, including the endothelium, are notably affected.

B. G. Maegraith

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## LEPROSY

*In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.*

PUBLIC HEALTH REP. Wash. 1956, Oct., v. 71, No. 10, 993-1001, 1 fig.

**Progress and Potentials in Leprosy Research.** Abstracts of a Conference on Leprosy held at Carville, La., January 10-11, 1956.

At this conference most of the persons in the United States engaged in the study of leprosy were brought together. Discussions covered bacteriology, animal inoculation, immunology, biochemistry, pathology, metabolism and nutrition, chemotherapy, epidemiology, and clinical observations. Twenty-five papers are abstracted. Among the more interesting findings are the following.

J. H. HANKS finds that, using metabolic methods of studying mycobacteria, two essential features are quite different from the features of standard bacteriological methods: (1) the study of the hydrogen exchange as measured by the quantities of hydrogen liberated when oxygen is excluded from the reaction; (2) the oxygen uptake by bacteria in the Warburg apparatus. The capacity of the rat leprosy organism to respire independently of the substrate indicates that in the rat's tissues it is not dependent on cell respiration or intracellular enzyme systems, and can respire or metabolize independently from the cell. "Until metabolic activity of the organism can be shown by metabolic study methods to gain energy in time, there is no point in employing standard bacteriological methods in leprosy."

W. H. FELDMAN recommends the empirical approach to the problem



of inoculating animals with *Myco. leprae*, suggesting apes, hamsters, young swine and calves. He suggests reducing host resistance by whole-body radiation to reduce properdin levels, or using hormonal substances or agents adversely affecting animal metabolism. This author and C. H. BINFORD suggest the intradermal route of inoculation, as the organism has a preference for low body temperatures. For this reason a hairless strain of mice might be used. Intraneural inoculation might also be tried.

C. C. SHEPARD recommends tissue culture in the measurement of the activity of drugs against mycobacteria.

J. A. DOULL, in a carefully controlled study in the Philippines, found that in 71.2 per cent. of previously negative children the Mitsuda reaction had become positive 90 days after BCG inoculation. In control groups given saline or diphtheria toxoid the proportion becoming positive was 27.1 per cent. This might be due to the original lepromin test or to some unknown cause. "By the device of leaving a sample of the originally selected children untested at the outset and unvaccinated, it was possible to compare the final lepromin status of three comparable groups: (1) children given BCG and an initial lepromin test, (2) children given saline or toxoid and an initial lepromin test, and (3) the basic controls. From comparisons of these groups, it was estimated that the proportion of all children who had become lepromin positive because of BCG was only 33.4 per cent., because of the lepromin test, 7.2 per cent., and because of natural causes, 11.5 per cent." Naturally acquired reactivity is too frequent to be due to exposure to leprosy, and it cannot be due to exposure to tuberculosis as only 2.3 of the children reacted to tuberculin at the outset as compared with 23.2 per cent. who showed reactivity of the Mitsuda type.

G. L. FITE asks: "How does the accumulated knowledge of anatomic leprosy suggest or indicate lines for further inquiry?". It is the early phases that have to be studied. Classifications are of value only in indicating where to look for the factors that determine whether a patient has one or another type of leprosy.

Study of nerve endings is useful only in so far as it can show the mechanism.

Y. T. CHANG uses intraperitoneal inoculation of mice in testing the efficacy of drugs by measuring the lesions that follow. Out of 13 compounds tested 5 were found active: streptomycin, nicotinamide, pyrazinamide, isoniazid, and diaminodiphenyl sulphone.

L. F. BADGER, W. H. MYER and F. C. KLUTH write on epidemiology and control in Louisiana and Texas. Badger writes: "The ideas that the disease is feebly contagious and that prolonged exposure is necessary are not supportable. The figures show that infections in children have been overemphasized; a good many occur after exposure in adult life. . . . The source of infection is more frequently outside the family than within." Meyer and Kluth emphasize the need for quiet and unheralded operation of contact investigation.

R. R. WOLCOTT, writing of sulphone therapy, found that a patient with lepromatous leprosy has a 40 per cent. chance of arrest of disease after 8 years' treatment, though apart from that many other benefits accrue from the sulphones, including life expectancy. *Ernest Muir*

AVILÉS NUGUÉ, F. & BLUM GUTIÉRREZ, E. La lepra en el Ecuador. Algunas observaciones sobre el problema. [**Observations on Leprosy in Ecuador**] *Rev. Ecuatoriana de Hig. y Med. Trop.* Guayaquil. 1956, Apr.-June, v. 13, No. 2, 95-103, 3 graphs.

The authors have already recorded 60 new cases of leprosy in Ecuador [this *Bulletin*, 1955, v. 52, 784] and now record 60 more. Of the 120, 80 were lepromatous, 36 tuberculoid and 4 indeterminate. Most of the patients were adults, 87 were men and 33 women. The disease was distributed as follows in the Provinces: Guayas (69 cases), Los Ríos (18), El Oro (14), Manabí (5), Esmeraldas (2), Azuay (7), Bolívar (2), Loja (2) and Cañar (1). *H. J. O'D. Burke-Gaffney*

HANKS, J. H., with the assistance of Tobey BACKERMAN. **Retention and Differentiation of Mycobacteria in Tissue Sections.** *Amer. Rev. Tuberculosis.* 1956, Oct., v. 74, No. 4, 608-615.

[This abstract appeared also in the *Bulletin of Hygiene*, 1957, v. 32, 192.]

From studies made on lepromatous tissue, most of which was from sulphone-treated patients, the following conclusions are reached.

Mycobacteria can be lost from paraffin-embedded tissue during the rapid removal of wax by xylene or benzene, by turbulent interaction of the reagents during hydration, and by decolorizing with acid-alcohol. These losses can be minimized by using mixtures of mineral oil and xylene or turpentine, avoiding the use of alcohol, and by decolorizing with either 4 per cent. sulphuric acid or 2.5 per cent. ferric ammonium sulphate and 2.5 per cent. sulphuric acid, either decolorizer containing the counterstain, methylene blue.

[These recommendations support those of WADE, made nearly 30 years ago, that less *Mycobacterium leprae* will be lost from lepromatous tissue if essential oils are used for dehydration and clearing.]

*S. R. M. Bushby*

GEHR, E. & STOLZE, E. **The Significance of Thickened Nerves in the Diagnosis of Leprosy.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, Dec., v. 8, No. 4, 351-6, 5 figs.

One of the authors had noticed in 1,069 healthy persons in Surinam a high proportion with thickening of nerves, and in 215 healthy contacts with leprosy the proportion was even higher. To clarify matters the ulnar nerves were prepared and inspected at 82 post mortems, and in 9

cases the ulnar nerves were enlarged, although the patients were not known to have suffered from leprosy. The nerves were found to have "signs of a chronic, nonspecific, fibrotic neuritis, in two cases so far advanced that only a few normal nerve fibres were left". Ten further specimens of thickened nerves from persons not known to have had leprosy "showed either perineural and intrafascicular connective tissue proliferation or only a paucicellular oedema". In all, the ulnar nerve seemed thickened in 24 out of 278 persons without signs of leprosy.

It is considered that a diagnosis of leprosy on the evidence of thickened nerves is not warranted, although "most of the cases observed by us represent residual states of old processes that might very well coincide with skin lesions of various origins. Biopsies of nerve tissue would doubtlessly solve the problem in many cases but are rarely practicable".

*Ernest Muir*

SOMERSET, E. J. & SEN, N. R. **Leprosy Lesions of the Fundus Oculi.**

*Brit. J. Ophthalm.* 1956, Mar., v. 40, No. 3, 167-72, 3 figs.  
[21 refs.]

When leprosy affects the eye itself, it commonly attacks the anterior segment. Lesions of the posterior segment are rare, and their existence is disputed by many eminent authorities. In the paper under review, the authors found fundus lesions in 2 out of 224 patients. It is not clear from their account whether these patients were consecutive cases of leprosy only, or consecutive cases of leprosy with other manifestations of ocular leprosy. If the latter, then fundus lesions in ocular leprosy can be regarded as distinctly uncommon.

The lesions which they observed were not unlike retinal tubercles, and were located at the periphery of the retina, resembling in size and shape the miliary lepromata often seen on the irides of patients with ocular leprosy.

The patients had been treated for leprosy, and in one case the retinal lepromata had disappeared after 20 months, but in the other they were still present after 6 months.

In the absence of pathological examination of these retinal lesions, it is impossible to be certain that the authors have described true leprosy lesions of the choroid and retina, but it is a likely supposition.

[This paper is an interesting addition to our knowledge of the subject of ocular leprosy.]

*D. P. Choyce*

NAGUIB, M. & ROBSON, J. M. **Correlation between Rate of Development of Corneal Lesion and Size of Inoculum of *Mycobacterium leprae*.** *J. Path. & Bact.* 1956, Oct., v. 72, No. 2, 657-61, 3 figs.

"A suspension of *Mycobacterium leprae* was diluted 10, 100, 1,000 and 10,000 times and the various dilutions inoculated intracorneally



into groups of mice. It was found that with increasing dilutions the latent period preceding the appearance of macroscopic lesions gradually increased. There were no qualitative differences between the lesions produced by the various dilutions. This suggests that the results previously obtained with heated and merthiolate-treated suspensions of *Myco. lepraemurium* can be explained by assuming that the treatment (heat or antiseptic) kills a large proportion of the organisms."

[See this *Bulletin*, 1956, v. 53, 1437.]

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## HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:—TREMATODES (schistosomes, other flukes); CESTODES (Diphyllbothrium, Taenia, Echinococcus, other cestodes); NEMATODES (Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

MALDONADO, J. F. **An Evaluation of the Standardized Direct Smear for Egg counting in Parasitological Work.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 888-92, 1 fig.

The author compared the efficacy of the standardized direct smear method of BEAVER [this *Bulletin*, 1949, v. 46, 953; 1951, v. 48, 652] and the dilution method of STOLL and HAUSHEER [*ibid.*, 1926, v. 23, 776 *bis*]. He based his study on 1,000 faecal samples, in which he found 411 infections with *Ascaris lumbricoides*, 951 with *Trichuris trichiura*, 449 with *Necator americanus* and 317 with *Schistosoma mansoni*.

For details of the methods used and of the statistical analyses made the paper itself must be consulted. The data were analysed by the  $\chi^2$  test and coefficients of correlation and the two techniques compared favourably; but the author concludes that the standardized direct smear is the method of choice. It takes less time, is easily done and is not affected by the consistency of the stool.

G. Lapage

GERWEL, C. & PAWŁOWSKI, Z. Spostrzeżenia nad skutecznością hexylresorcinolu w zwalczaniu robaczyc. [**Observations on the Efficacy of Hexylresorcinol in Helminthiasis Treatment**] *Wiadomości Parazytologiczne*. Warsaw. 1956, v. 2, No. 5, 283-91. [33 refs.]

The English summary appended to the paper is as follows:—

"The authors give the results obtained by applying Hexylresorcinol in following cases of worm infestations: ascariasis, trichuriasis and enterobiasis. 671 sick were treated with Hexylresorcinol by administering the physic once a day before breakfast (on an empty stomach) in a dosage of 0.15 to 1.05 g according to the age.

"*Ascariasis*: Treated were 58 sick, controlled 47. By treatment applied once were cured 20 sick, i.e. 42 per cent. Out of 75 sick at the same time treated with Santonin, 63 recovered, i.e. 84 per cent.

"*Trichuriasis*: Treated were 143 sick (city and country inhabitants) and the results controlled in 69 patients, after 2, 4 and 8 weeks. When treated once 37 sick recovered, i.e. 54 per cent. It was stated that the efficiency of Hexylresorcinol increases with the age of the sick. Cases with great intensity of the invasion are difficult to be cured (only 13 per cent of patients recovered) but even these sick showed a considerably improved state of health (clinical recovery).

"*Enterobiasis*: Treated were 470 persons, children and adults, 208 were controlled weekly within 2 months by the Hall's method. It appeared that on the third week after treatment in 50 per cent of the sick no parasites were to be found. But since this time a constant growing of repeated invasions became evident and on the ninth week but 11.5 per cent appeared not to have parasites.

"Among all the sick 22 per cent showed secondary symptoms shortly after having taken the physic."

HARANT, H., CASTEL, P. & GRAS, G. Valeur anthelminthique de quelques composés minéraux de l'étain. [**Anthelmintic Value of Some Preparations of Tin**] *Montpellier Méd.* 1956, May, v. 49, No. 5, 432-43. [34 refs.]

Metallic tin and various tin compounds were tested for anthelmintic activity. Methods included *in vitro* studies with *Rhabditis macrocerca* cultivated in rabbit dung; *in vivo* studies in white mice parasitized by *Syphacia obvelata* and *Aspicularis tetraptera*, in albino rats infected with *Nippostrongylus muris* and in mice and rats infected with *Hymenolepis fraterna*. In addition, a few clinical trials were made on infections with *Hymenolepis nana*, *Fasciola hepatica* and *Taenia saginata*.

The authors conclude that tin compounds are of no value against nematodes but are useful against the tapeworm infections studied. In rats and mice the action of the tin compounds against tapeworms was improved by the addition of small quantities of mepacrine.

The techniques and results are described in detail and there is a review of the relevant literature.

B. G. Maegraith

McCULLOUGH, F. S. **Transmission of *Schistosoma haematobium* by *Bulinus* sp. in the Ke District of the Gold Coast.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Sept., v. 50, No. 5, 449-57, 1 fig. & 1 map. [15 refs.]

"(1) Observations on *S. haematobium* infection and on the potential snail hosts, in the Ke area of the Gold Coast, are described.

" (2) In the area the incidence of *S. haematobium* in children is high, and its transmission is associated with the lagoons and swamps leading to the Volta, but not with the river itself.

" (3) The only potential snail hosts found in the area are *Bulinus* sp., *sensu stricto*, and *Bulinus* (*Pyrgophysa*) *forskali*, the distribution and ecology of which are described. *Physopsis* sp., the important snail host elsewhere in the Gold Coast, appears to be absent from the area.

" (4) The local species of *Bulinus* appears to differ markedly from *B. senegalensis*, *B. tropicus* and *B. truncatus*. The features of its shell correspond closely to *B. sericinus*.

" (5) Evidence is given showing that laboratory-bred *Bulinus* sp. from the Ke area is readily susceptible to *S. haematobium* derived from locally infected children. There is yet no direct evidence that *B. (P.) forskali* can transmit the parasites in the Gold Coast. It is thus apparent that *Bulinus* sp. is the important, and probably the exclusive, snail vector in the area.

" (6) The different molluscan hosts which transmit *S. haematobium* in the territories of British West Africa are discussed in respect of their importance in each territory.

" (7) The future status of schistosomiasis in the Ke area is discussed with particular reference to the proposed Volta River Project and the associated irrigation of the Accra plains."

GADGIL, R. K. & SHAH, S. N. **Human Schistosomiasis in India. Part IV. Establishing the Life Cycle in the Laboratory.** *Indian J. Med. Res.* 1956, July, v. 44, No. 3, 577-80, 1 fig.

Earlier papers in this series [this *Bulletin*, 1953, v. 50, 317; 1956, v. 53, 769, 770] describe the discovery of an endemic focus of urinary schistosomiasis in western India, the epidemiology of infection in the village of Gimbvi and the maintenance of snails in the laboratory. This report deals with the technique employed in the infection of the snail *Ferrisia tenuis* and subsequent exposure of laboratory animals. Between 2,500 and 3,000 laboratory-bred snails were exposed to mass infection in batches of 75 or 100. About 500 miracidia were used for each batch and after 4 hours' exposure the snails were transferred to aquaria. The mortality rate was high, for only 500 snails remained alive at the end of 4 weeks. At this time the snails were examined for cercarial discharge by enclosing them, in batches of 100, in test-tubes of water at 27°C. The cercariae, described as brevicercous, were discharged in small numbers. Four white mice were exposed to an unspecified number of cercariae by the tail-immersion method. Of these 4 mice, 3 died during the first month after exposure. No developing schistosomes were found in their tissues. The remaining animal was killed and autopsied 62 days after exposure but no schistosomes were found in the mesenteric veins.



The liver was cut into thin slices and examined in crush plates. Paired worms were found.

The authors conclude that *F. tenuis* can act as an intermediate host for *Schistosoma haematobium*. The other indigenous snail, *Paludomus obesa*, has not been found infected in nature and has resisted infection in the laboratory.

[In view of the fact that *F. tenuis* is the first member of the Ancyliidae to be incriminated as a potential vector of schistosomiasis it is to be hoped that the authors will publish a detailed description of the anatomy of the adult schistosomes recovered from experimental animals. It is necessary that this be done before the species can be accepted as *S. haematobium*.]

O. D. Standen

TEYSSANDIER, M. J. Recherches sur la bilharziose uro-génitale à propos de cent observations. [**Study of 100 Cases of Urogenital Schistosomiasis**] [Thesis]. 122 pp., 19 figs. (12 coloured) on 8 pls., 1 diagram & 1 chart. [321 refs.] 1956. Marseilles: Imprimerie M. Leconte, 98, Cours Lieutaud.

During an 18-month period over 1954 to 1955 100 cases of urogenital schistosomiasis have been disclosed by examinations at a military hospital in Marseilles. After a general account of the disease, and the aetiological factors influencing it, culled from the literature, the author in some detail lists many of the manifestations of *Schistosoma haematobium* infections described by other workers, and reports the incidence of these among his own patients. The bibliography he has apparently consulted is considerable and the references to it are extensive, but he himself does not add to previous knowledge of the subject. He is impressed by the incidence of the disease in Marseilles, and by the wide geographical range of its acquirement overseas. He only briefly mentions the subject of treatment; anthiomaline appears to have been the drug of his choice, as tartar emetic he considered too dangerous and both Fouadin and lucanthone he thought to be too toxic.

A. R. D. Adams

MARKS, C. **The Surgical Sequelae of Bilharzial Disease.** *South African Med. J.* 1956, Nov. 10, v. 30, No. 45, 1084-6.

The infection rate of schistosomiasis in the Central African Federation is 80 per cent. among Africans and 10 per cent. among Europeans; the systems most commonly affected are the urinary and the alimentary.

*The Bladder.* After the migration of the parent worms from the portal vein to the vesical venous system, the ova are deposited in the terminal venules and reach the submucous layer of the bladder. Here they set up an intense hyperaemia and oedema of the peri-ureteric vesical mucosa and at this stage the urine is teeming with terminal-spined ova and red

blood cells. Blockage of the submucous glands leads to the formation of pale, bullous cysts, later the epithelium becomes heaped up into papillary projections by the vascular granulation tissue which develops; these masses respond well to a combination of systemic antimony therapy and local cystoscopic fulguration, leaving only small fibrotic nodules. Ulceration of the bladder may occur and a vesico-vaginal fistula, or rupture of the bladder, may follow. Secondary infection may result in focal or general phosphatic incrustation of the bladder mucosa, but urinary lithiasis is rare in the African. Malignant vesical ulceration may be associated with schistosomal cystitis, so that biopsy is essential before systemic therapy is begun, but the author has failed to find significant relationship between the two diseases; in 78 African admissions for vesical carcinoma there were 43 in which there was concomitant schistosomiasis, but the carcinoma was of transitional or mixed-cell type, whereas squamous-cell carcinoma would be expected if the growth were due to epithelial metaplasia from irritation by the ova.

*The Ureter.* The earliest vesical involvement occurs in the peri-ureteric region; hence stricture and obliteration of the orifice may occur, with reflux of urine and dilatation. "The pelvic ureter often suffers oviposition." Cystoscopic meatotomy, followed by regular bougie dilatation, may be of benefit, but where there is localized dilatation of the lower ureter, with recurrent sepsis or back-pressure, the affected segment should be resected, with implantation of the ureter into bladder or bowel. Nephrectomy may have to be performed.

*Alimentary System.* *S. mansoni* has a predilection for that part of the alimentary tract which is drained by the inferior mesenteric vein, where colitis and proctitis may cause abdominal pain and bouts of diarrhoea with blood and mucus in the stools; the ova may be found in the stools. Sigmoidoscopy shows a congested haemorrhagic mucosa and biopsy affords histological confirmation and differentiates the condition from carcinoma. Rectal or colonic schistosomiasis is never potentially malignant; it resolves rapidly with systemic antimonial therapy.

*The Vermiform Appendix* is readily susceptible to oviposition, but in 92 per cent. of cases *S. haematobium* is the cause. Two forms are described, (1) appendiceal schistosomiasis where oviposition occurs in the appendix, but which heals without involving the lumen, (2) schistosomal appendicitis where there is gross structural change, producing acute or chronic appendicitis by partial or total obliteration of the lumen.

*Schistosomal Hepatosplenomegaly.* Oviposition in the liver causes local inflammatory reaction forming multiple tubercles, occasionally a single large "bilharzioma" or a liver abscess from secondary infection. Ova are rarely found in the spleen in splenomegaly. GELFAND (1950) [this *Bulletin*, 1950, v. 47, 903] found ova in the liver in 56 per cent. and in the spleen in 10 per cent. It is suggested that Egyptian splenomegaly is caused by lobular cirrhosis due to subnutrition, the schistosomal toxins acting as adjuvants.

*Miscellaneous.* Schistosomal salpingitis, cervicitis and vaginitis are often met with and cause sterility and ectopic pregnancy. Ova have been found in the uterus and in the centre of uterine fibroids. Orchitis is the only lesion of the male genitals reported. *W. L. Harnett*

PAUL R. **Pulmonary Schistosomiasis.** *Central African J. of Med.* 1956, Oct., v. 2, No. 10, 355-60, 6 figs.

The examination of 200,000 chest skiagrams of Africans in Northern Rhodesia, among whom schistosomiasis is common, during the last 8 years suggested that this condition was not responsible for radiologically specific abnormalities among them [see also this *Bulletin*, 1937, v. 34, 863; 1939, v. 36, 39, 620; 1950, v. 47, 903]. A controlled study of 300 African recruits with microscopically diagnosed *Schistosoma haematobium* infections, without symptoms, subsequently confirmed this view. All those passing eggs in the urine had albuminuria. Fifty-four (18 per cent.) of these patients had an eosinophil count of under 4 per cent.; in the remainder the count was higher, but in the great majority it was under 10 per cent. The blood picture otherwise showed no specific changes. In 193 instances the erythrocyte sedimentation rate [ESR] (Westergren method) was 10 mm. or more in one hour but a high ESR, probably due to subclinical infections, is not unusual even in apparently healthy Africans.

Microscopical search of the sputum from each of the 300 patients did not yield *S. haematobium* eggs. There were no complaints of chest symptoms. Careful studies of radiograms of the chest contents of the selected infected group, and of control patients, showed no characters in the former indicative of schistosomiasis. Clinical and electrocardiographic studies revealed no cases of cor pulmonale. Available post-mortem specimens of lung tissue containing schistosome eggs showed such small lesions that they could not be detected radiologically.

None of the findings in these cases suggest that recruits infected with schistosomiasis are unsuitable for engagement for mining.

*A. R. D. Adams*

SALEM, H. H. **Tartar Emetric Toxicity in Bilharzial Therapy treated with Oxyphenonium Bromide (Antrenyl Bromide).** *J. Egyptian Pub. Health Ass.* 1956, v. 31, No. 3, 85-98. [38 refs.]

After a brief but useful review of the history of tartar emetic and its introduction as a therapeutic agent, and of its toxic side-effects, the author discusses methods of combating the latter. The toxic symptoms due to this drug suggest a vagotonic action as their source. The belladonna alkaloids cannot satisfactorily be used to counteract this as they themselves cause unpleasant side-reactions. Newer drugs, with an



anticholinergic effect, suggest themselves as suitable alternatives. One of these is the synthetic quaternary ammonium compound oxyphenonium bromide (Antrenyl bromide) which has atropine-like properties.

Of 30 patients under treatment with tartar emetic, 27 were given Antrenyl intramuscularly half an hour before each emetic injection; 3 were given it just before the injection. Nearly all the former were benefited by the Antrenyl treatment, but the latter 3 were not. Another 30 patients were given Antrenyl orally one hour before the injection of the tartar emetic; the results were less satisfactory. The author then gave the drug intravenously (dose 2 mgm.) together with the tartar emetic to 100 patients; the results were so promising that he was able to give the injection every day (for 15 days) instead of every alternate day. There were mild side-reactions to the Antrenyl treatment in the form of dry mouth, blurred vision, difficulty in swallowing, constipation, urinary hesitance, and an accelerated pulse rate. Nevertheless the use of Antrenyl, given intramuscularly or intravenously with the tartar emetic solution, enabled the tartar emetic treatment to be given daily, and the gross dosage of tartar emetic could safely be raised from the usual 22.5 grains to 30 grains as a result of it.

A. R. D. Adams

TRIMBLE, A. P. **Experiences in the Treatment of Urinary Schistosomiasis with Nilodin (Miracil D).** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Nov., v. 50, No. 6, 576-8.

Ten to 15 per cent. of men in African units serving in Malaya during the last few years have been found to have parasitologically proven urinary schistosomiasis. The affected were treated with 20 mgm./kgm. of Nilodin (Miracil D) [lucanthone], in divided doses, daily for 6 days. The cure rate in 175 men re-examined 3 to 6 months later was 95 per cent., as judged by urinary examinations; but cystoscopic examinations at this time still showed gross bladder lesions in many cases. Belladonna or Anthisan [mepyramine] were given when signs of drug toxicity became manifest, usually between the third and fifth days of treatment, and these substantially lessened them.

A. R. D. Adams

ROWLAND, H. A. K. **The Intensive Treatment of Urinary Schistosomiasis with Trivalent Sodium Antimony Gluconate.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Nov., v. 50, No. 6, 565-75.

This drug [TSAG] contains 32.7 to 37.8 per cent. of metallic antimony; it is said to be less than one-third as toxic as tartar emetic. Reports from various workers indicate that the drug is well tolerated in total dosages of 14.8 to 36 mgm./kgm. when given intravenously for 12 days, and that the immediate results in urinary schistosomiasis are good [this *Bulletin*, 1951, v. 48, 49, 480; 1954, v. 51, 1171].

In a 14-month period during 1954 and 1955 patients (143 Africans; 1 coloured; 4 European) with *Schistosoma haematobium* infections (2 of them also were passing *S. mansoni* eggs in the urine) were treated with TSAG. Some were given 18 to 31.3 mgm./kgm. of TSAG intravenously over periods ranging from 24 to 120 hours; the remainder (22) were given 12.2 to 17.1 mgm./kgm. within 8 hours. Ninety-eight [? 95 according to the tables] of the patients remained under surveillance for 6 months; 83.3 per cent. of 80 treated for the longer period, but only half of 18 treated for the short period, were freed of their infections. A high cure rate was not associated with increased manifestations of toxicity of the drug; with the more intensive treatments the incidence of toxic effects was greater, though in no case were they very severe. The test of cure was examination of the urine monthly, and then of 3 consecutive daily specimens and a rectal biopsy at the end of 6 months.

A. R. D. Adams

LAGRANGE, E. Quelques observations sur les insectes aquatiques malacophages. [**Observations on Aquatic Insects which feed on Snails**] *Riv. di Parassit.* Rome. 1956, July, v. 17, No. 3, 184-6.

Direct observations on the water bugs *Naucoris* and larvae of the dragonflies *Aeschna* and *Anax* introduced into aquaria containing snails showed that all these insects feed readily on *Planorbis*. The upper size limits of the prey taken by the 3 insect predators were 2 mm., 5 mm. and 14 mm. in diameter respectively. *Anax* was also observed to feed on *Limnaea*. Similar experiments with the water bugs *Notonecta* and *Corixa*, larvae of the dragonfly *Libellula*, and the adult water beetles *Cybister* and *Acilius* did not produce direct observation of these insects as predators of molluscs. [For other observations on the predators of aquatic molluscs see this *Bulletin*, 1950, v. 47, 476; 1952, v. 49, 781; and 1954, v. 51, 1171.]

B. R. Laurence

REY, L. A frequência provável da esquistossomose mansônica em São Paulo. [**Probable Prevalence of Schistosomiasis mansoni in São Paulo, Brazil**] *Hospital.* Rio de Janeiro. 1953, Nov., v. 44, No. 5, 589-97, 1 fig. [21 refs.]

The English summary appended to the paper is as follows:—

“In the absence of a wide epidemiological survey indicating the prevalence of schistosomiasis (*S. mansoni*) in the State of São Paulo, Brazil, the author made an indirect estimation of the probable number of cases of the disease.

“Only few, small, scattered foci of autochthonous cases are known to occur in São Paulo, but on the basis of the number of immigrants from other States where the prevalence of the disease has been established through regular surveys, the author estimates that there are at least

about 92 thousand cases in the State (1.09% of the total population), more than 19 thousand of which are within the city of São Paulo (1.01% of the inhabitants).

“He concludes by calling the attention to the necessity of facing schistosomiasis as a medico-social problem even in the State of São Paulo, and to the possibility of expansion of the known endemic foci in Southern Brazil.”

HARRY, H. W. & CUMBIE, B. G. **The Relation of Physiography to the Types of Freshwater Environments and the Presence of *Australorbis glabratus* in Puerto Rico.** *Amer. J. Trop. Med. & Hyg.* 1956, July, v. 5, No. 4, 742-56, 6 figs. [15 refs.]

“The differentiation of the kinds of habitats favorable or unfavorable for *Australorbis glabratus* is an initial step in seeking the essential factors associated with its distribution. It is also possible that such basic considerations may be of value in the control of schistosomiasis. In Puerto Rico the snail occurs in some low gradient streams, major aqueducts, disjunct marginal pools along streams, the estuarine marshes and limestone sink-ponds. It is absent, as perpetuating populations, in the major reservoirs, most artificial irrigation tanks, temporary flowing and nonflowing waters, in environments which have tidal fluctuation, in high gradient streams on any rock type, and in low gradient streams on limestone. The correlation of the various types of freshwater environments with the climate and physiography have been discussed. Schistosomiasis is not regularly transmitted in some areas where the snail occurs, e.g. the limestone area of the north coast. It is not known whether this is due to infrequency of human contact or some other factor. The occurrence of the snail vector in some isolated freshwater environments emphasizes that it is capable of crossing barriers to invade new habitats by passive dispersal.”

HARRY, H. W. & CUMBIE, B. G. **Stream Gradient as a Criterion of Lotic Habitats suitable for *Australorbis glabratus* in Puerto Rico.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 921-8, 4 figs.

This paper records the results of a study in Puerto Rico of the gradients of 12 streams in relation to the presence or absence of *Australorbis glabratus*. As a result of examining more than 350 collecting stations the conclusion was reached that this vector did not permanently inhabit reaches of streams with a fall steeper than 20 m. in 1,000 m., a gradient of 0.02, though it may be found temporarily in stretches normally too steep for it as a result of being flushed down from a permanent habitat upstream. Long stretches of stream with a gradient of less than 0.01 are often favourable for *Australorbis* but low-gradient reaches immediately



downstream from extensive high-gradient reaches are unfavourable. Gradient is only one factor determining the suitability of a habitat and it appeared that some degree of organic enrichment of the water was advantageous to the snail, but intense pollution was inimical. Streams from limestone and some other formations were unfavourable, and it is suggested that critical levels of dissolved solids are a factor in snail distribution.

T. H. Davey

PASSALACQUA, L. A., RODRIGUEZ-MOLINA, R. & OTERO, P. J. *Schistosoma mansonii* Granuloma with Abscess, Formation, Paracolic, adherent to the Ascending Colon and Anterior Abdominal Wall. Report of a Case. *Bol. Asoc. Med. de Puerto Rico*. 1956, Aug., v. 48, No. 8, 325-34.

Many complications and abdominal surgical conditions result from Mansonian schistosomiasis. This is a record of one such case, in Puerto Rico, where the diagnosis became clear only post-operatively.

A. R. D. Adams

AREÁN, V. M. Lesions caused by *Schistosoma mansonii* in the Genito-urinary Tract of Men. *Amer. J. Clin. Path.* 1956, Sept., v. 26, No. 9, 1010-21, 12 figs. [15 refs.]

*Schistosoma mansonii* usually inhabits the mesenteric and portal veins to the exclusion of other venous systems. Rarely it infests the vessels in the male genito-urinary tract. This is a report of 10 such cases, in Puerto Rico, found among 78,000 surgically removed specimens and 3,232 autopsy specimens examined during the period 1925-1955. The kidneys were the site in 4 patients, the prostate in 2, the bladder in one, and the testes in 3. There are detailed case reports of each of the patients from whom the material was collected, and an account of the pathological and histological findings in each. The histological findings are illustrated by photomicrographs. In most cases the discovery of the lesions was incidental on post-mortem examination. [See also, GELFAND, this *Bulletin*, 1950, v. 47, 903; 1953, v. 50, 731.]

A. R. D. Adams

ALI, R., HILLERS, A. & STOLZE, E. *Schistosoma mansonii* Infections of the Female Genital Organs. *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, Dec., v. 8, No. 4, 335-6, 4 figs.

"A clinical and pathological description is given of two *S. mansonii* infections which presented the clinical aspect of chronic salpingitis and an ovarian cyst, respectively. A pair of worms was found in the wall of the cyst, whereas the ova lay in the tube."

[See this *Bulletin*, 1953, v. 50, 956.]

DE FARIA, J. L. **Pulmonary Arteriovenous Fistulas and Arterial Distribution of Eggs of *Schistosoma mansoni*.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 860-62, 3 figs.

The author, from São Paulo, Brazil, discusses the literature on the dissemination of *S. mansoni* eggs to various organs and then describes the post-mortem findings in a patient who died of diffuse glomerulonephritis. Schistosomal rectitis, liver cirrhosis, granulomas and arteriovenous fistulae caused by eggs in the lungs were found. There was no evidence of cor pulmonale. A schistosome egg of  $63\mu$  in diameter was found in the lumen of a pulmonary vein. The vessel wall was thin and consisted of endothelium, a very thin elastic interna and an adventitial collagen layer. A small area of the egg shell adhered to the wall of the venule. There was no inflammatory reaction. Few eggs were found in the liver but an egg ( $125\mu$ ) was found adhering to the wall of a small hepatic artery: it was covered by a hyaline thrombus. Some of the muscle fibres of the artery were necrosed and there was an inflammatory reaction in the adventitia and periadventitial tissue.

It is suggested that these eggs may have been carried from the pulmonary arterial tree into the pulmonary vein and the systemic arterial circulation through the not infrequent pulmonary arteriovenous fistulae caused by the eggs. While this could occur through the arteriovenous anastomoses normally seen in the lungs, no such anastomoses were found in this case. [See also this *Bulletin*, 1955, v. 52, 796; 1956, v. 53, 210.]

H. J. O'D. Burke-Gaffney

DA SILVA, J. Rodrigues. Quimioterapia por via oral na esquistossomose mansoni. [**Oral Chemotherapy of *Schistosoma mansoni* Infections**] [Thesis]. 220 mimeographed pp. 1955. Rio de Janeiro: Rua Souza Lima, 185, apt. 1002.

This exhaustive monograph is a thesis prepared by the author, from Rio de Janeiro. The extent to which the literature has been covered may be judged by the list of references, which amounts to almost 250 entries.

After an introductory discussion of the biology and features of *S. mansoni* infection and the basis on which therapy is founded, the author refers briefly to the drugs used parenterally. He then proceeds to his main subject, the value of oral treatment. He outlines the introduction and use of the thioxanthone derivatives and describes at length his own experience of them in over 100 cases, including efficacy, tolerance and side-effects.

There are then sections on the oral use of antimonials, and on trials of diethylcarbamazine and of tin preparations.

The main conclusion is that Miracil D, preferably in the form of the salicylate, is satisfactory in suitable cases, particularly where antimony is contra-indicated.

This is the briefest outline of a very full monograph which should be consulted with profit by those who read Portuguese.

H. J. O'D. Burke-Gaffney

RIVERA, J. V., RODRIGUEZ, H. F. & PÉREZ-SANTIAGO, E. **Thrombocytopenic Purpura due to Fuadin (Stibophen).** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 863-8, 2 figs. [15 refs.]

Stibophen (Fuadin), given intramuscularly, is recoverable in largest amounts from the liver, kidneys and thyroid gland. In the blood it is held by the red cells rather than by the plasma; it is attached to the globin part of haemoglobin. Within 2 days some 50 per cent. of its antimony content is passed through the kidneys. Some rare cases of mild non-thrombocytopenic purpura and also of thrombocytopenic purpura have been attributed to the use of stibophen [this *Bulletin*, 1946, v. 43, 462].

The present report concerns a 33-year-old man in Puerto Rico, who initially was treated for a Mansonian schistosomal infection with 2 courses (40 ml. each) of stibophen with an interval of a month. After each injection of the second course there were skin petechiae and blood-streaked saliva. A month thereafter a third course of stibophen treatment was given. After the second and third injections there was similar bleeding; after the fourth giddiness, and some hours later bloody expectoration, generalized cutaneous and mucous membrane petechiae and ecchymoses, with bloody stools, subconjunctival haemorrhages, and a mucosanguineous nasal discharge. The platelet count was 63,000 per cmm., bleeding time 18 minutes, coagulation time 4 minutes, and prothrombin time 11.8 seconds. The urine urobilinogen was 1.3 Ehrlich units in 2 hours, and faecal urobilinogen 280 units in 24 hours. Corticotrophin treatment and a blood transfusion produced recovery. As the schistosomal infection persisted the patient was again given stibophen, though in lesser dosage, some 6 months later. Once more, after the sixth dose, he developed active signs of a thrombocytopenic purpura; the measures previously used were again adopted effectively to control it.

To determine if there was a factor in the patient's blood which precipitated thrombocytopenic purpura a healthy volunteer was given 3 doses of stibophen and then 150 ml. of the patient's plasma. A drop in the platelet count of the volunteer ensued. Subsequent repeated short courses of stibophen reproduced the thrombocytopenia in diminishing degree. A second specimen of plasma from the patient was given to the volunteer, but this did not cause thrombocytopenia; neither did its injection into a second volunteer, after stibophen injections.

The authors postulate that the thrombocytopenic purpura in their case was the result of a drug-antibody complex causing destruction, or agglutination, of the platelets and a diminution in megakaryocyte activity.

A. R. D. Adams



GONÇALVES, N. B. & SOARES, R. de R. L. Atividade moluscocida do ricinoleato de cobre. [**Molluscicidal Activity of Copper Ricinoleate**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1955, Oct., v. 7, No. 4, 445-53, 1 map. English summary.

In the search for further molluscicides with residual activity Gonçalves and Soares, in Brazil, have investigated the properties of several copper salts of oleic acids. Copper ricinoleate has proved to be relatively cheap and easy to prepare and its molluscicidal properties are the subject of this paper. It is not necessary here to detail the methods of preparation and application of this compound since these are clearly set out for those who wish to consult the original. The authors found that both in the laboratory and field trials the immediate lethal effect of copper ricinoleate is comparable to that of copper sulphate and the residual activity of the new compound is greater than that of pentachlorophenol or sodium pentachlorophenate. The authors suggest that certain inconsistencies in the results obtained at different times of year are accounted for by varying resistance of the snails according to the stage of their life cycle at the time.

C. A. Wright

GONÇALVES, N. B. & SOARES, R. de R. L. **Molluscocide Action of the Cupric Ricinoleate.** *Mem. Inst. Oswaldo Cruz*. 1955, June-Sept.-Dec., v. 53, Nos. 2, 3 & 4, 404-9. [Portuguese version 397-403, 3 figs.]

Cupric ricinoleate is prepared by adding cupric sulphate to a soap previously made from castor oil and potassium hydroxide. When this has been done, that proportion of the copper soap mixture which is not soluble in the water is deposited at the bottom of the receptacle in the form of a viscous greenish mass, which is then subjected to repeated washings in alcohol, until the waste fluid is colourless. The resultant material is then ready for use as a molluscicide and may be stored either as a viscous mass or else diluted with alcohol. [The above is a brief summarization of the very full description given in the original paper.] Under laboratory conditions, cupric ricinoleate was found to be lethal to *Australorbis glabratus*, killing 65 per cent. of the molluscs in a 1 in 20,000,000 dilution, 24 hours after the treatment of the aquaria in which the snails were kept. Under similar conditions a 1 in 10,000,000 dilution of cupric sulphate destroyed 45 per cent. of the molluscs, while sodium pentachlorophenol [the dilution does not appear to be mentioned] destroyed 5 per cent.

Under field conditions cupric ricinoleate, when sprayed on the margins of a small pond infested with *Australorbis tenagophilus*, destroyed the majority of the snails which came in contact with the treated area.

The authors' conclusions, as given in the English version, are as follows:—

"1. From preliminary tests effected in the laboratory and in an *A. tenagophilus* infected pool, it was verified that copper ricinoleate, when used in large dilutions and forming stable emulsions with the water, possesses a pronounced molluscicide action.

"2. The molluscicide action as exerted by this copper salt is much stronger than that of the cupric sulphate; like this one, it also develops an *immediate* and a *delayed* action; it is also much more powerful than the pentachlorophenol and its sodic salt, both of which have only a delayed action.

"3. The usage of this copper ricinoleate as a highly-active molluscicide is recommended, due to its easy preparation, low cost, insolubility in water, with a formation of emulsions of very small particles and tendency to form thin layers on vegetation, active not only in the emulsion but also after depositing."

R. M. Gordon

CALDWELL, A. G. & STANDEN, O. D. **The Activity of p-Aminophenoxy-alkane Derivatives against *Schistosoma mansoni*.** *Brit. J. Pharmacol. & Chemotherapy*. 1956, Dec., v. 11, No. 4, 367-74, 1 fig.

"1. Diphenoxyalkanes with different primary, secondary or tertiary amino-groups in the *p*-positions have schistosomicidal activity similar to that of the symmetrical *p:p'*-diaminodiphenoxyalkanes.

"2. Diphenoxyalkanes, having a *p*-amino group in only one ring, and any of a variety of substituents in the other ring, also have schistosomicidal activity, although this is in general lower than that of the diaminodiphenoxyalkanes. However, where the other group is acetamido-, acetmethylamido-, ethoxycarbonamido-, ethoxycarbonmethylamido-, or cyano-, high activity appears.

"3. *p*-Aminophenoxyalkoxyalkanes have moderate schistosomicidal activity.

"4. An attempt is made to define the minimum structural features necessary for activity in this series, and the relationship between structure and activity is briefly discussed.

"5. *p*-Aminophenol, and a few of its derivatives which are possible metabolites of these compounds, have shown no schistosomicidal activity."

[See this *Bulletin*, 1955, v. 52, 997.]

STANDEN, O. D. & WALLS, L. P. **Effect of Ring-Substituents on the Activity of Diphenoxyalkanes against *Schistosoma mansoni*.** *Brit. J. Pharmacol. & Chemotherapy*. 1956, Dec., v. 11, No. 4, 375-8, 3 figs.

"1. Substitution of CH<sub>3</sub>, OCH<sub>3</sub>, OH, Cl, or NH<sub>2</sub> into the aromatic rings of the symmetrical diaminodiphenoxyalkanes invariably results in a great reduction in activity against *Schistosoma mansoni*, loss of activity

usually being complete when a substituent ortho to the amino-group is present in both rings.

"2. The most active of the compounds in which both rings are substituted are the primary amines with methoxyl ortho to the ether linkage, and secondary amines with methyl similarly placed, but even these are only as active at 200 mg./kg. as are the unsubstituted compounds at 25 mg./kg.

"3. When one ring only is substituted with methyl the activity is intermediate between that of the unsubstituted and the disubstituted compounds, except for a nitro-amine substituted with methyl in the basic ring, which has high activity."

COKER, C. M. & LICHTENBERG, F. **A Revised Method for Isolation of *Schistosoma mansoni* Eggs for Biological Experimentation.** *Proc. Soc. Exper. Biol. & Med.* 1956, Aug.-Sept., v. 92, No. 4, 780-82, 2 figs. [12 refs.]

A method is given for the separation of the eggs of *Schistosoma mansoni* from the livers of infected hamsters. Egg separation is facilitated by storing the hamster corpses in the refrigerator for 1 or 2 days. The livers are removed, finely comminuted with 1.7 per cent. saline (normal  $\times 2$  to prevent the eggs from hatching) in a Waring blender and then flushed with saline through a double sieve of 50 and 80 mesh to remove coarse particles. The mixture is sedimented for half an hour and the sediment washed 4 or 5 times in 1.7 per cent. saline with low-speed centrifuging for  $1\frac{1}{2}$  minutes between washes. The washed sediment is then carefully pipetted on to the surface of 0.5 molar sucrose solution contained in a 50 ml. burette. Separation of particles is achieved by differential rate of sedimentation through sucrose solution. Particles heavier than *S. mansoni* eggs may be drawn off in 3-5 ml. after 15 minutes; after an hour most of the normal eggs are in the lower 15 ml. This is drawn off, washed free of sucrose and concentrated in 1.7 per cent. saline. Further purification may be achieved by flushing the concentrate over 325 mesh screen to remove particles smaller than the eggs. Eggs obtained in this way are largely free of debris and retain their ability to hatch, their acid-fast property and their antigenicity for circumoval precipitation in immune serum.

O. D. Standen

Hsü, H. F. & Hsü, S. Y. Li. **On the Infectivity of the Formosan Strain of *Schistosoma japonicum* in *Homo sapiens*.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 521-8, 5 figs. [15 refs.]

"Four human volunteers were exposed to 400 cercariae, and one to two batches each of 400 cercariae, of the Formosan strain of *S. japonicum*.



Acute abdominal pain, positive intradermal reactions, eosinophilia and histopathologic changes in the liver tissue similar to those produced by unisexual infection of male worms were found in due time after the exposure. Using the sedimentation method, daily stool examinations were negative for *S. japonicum* eggs throughout the study period of 204-336 days and liver biopsies showed negative findings of schistosome eggs and pigment. It is concluded that the Formosan strain of *S. japonicum* develops for a short period in the viscera of man but does not reach maturity. It must be regarded as a non-human, zoophilic strain."

STRANSKY, E. & REYES, A. **Liver Changes in Schistosomiasis in Children.**  
*J. Trop. Med. & Hyg.* 1956, Aug., v. 59, No. 8, 184-7.

In 14 cases of *S. japonicum* infection in Philippine children aged 5 to 13 years, the results of faeces examination, rectal scraping and liver biopsy are compared. Eggs were found in biopsy material in 11, in faeces in 8, and in rectal scrapings in 5 (out of 12).

No relation was found between the histological changes observed at biopsy and the results of "liver function tests" (turbidity tests and estimations of serum proteins). In 10 biopsies (including those from the 2 youngest children) periportal fibrosis of some sort was present with or without fatty changes in the liver cells; ova were not found in 3 specimens (2 from patients in whom ova were present in the faeces). Fatty changes only were present in 4 biopsy specimens, all of which also contained ova.

No clinical details or information concerning methods of examination are given. There are no histological photographs. *B. G. Maegraith*

FRICK, L. P., LIN, S. S. & WILLIAMS, J. E. **Efficacy of Abbott's Insect Repellent Cream (E4856) in preventing *Schistosoma japonicum* Infections in Mice.** *J. Parasitology.* 1956, Oct., v. 42, No. 5, 528-30.

"Under conditions of laboratory experiments, topical applications of Abbott's Insect Repellent Cream (E4856) prevented infections with *Schistosoma japonicum* in mice for limited periods of time. Protection was not absolute in every instance; however, a significantly large number of experimental animals received complete protection if exposed to cercariae within 12 hours after application of the repellent. Mean worm burdens in mice exposed after 6, 12 and 24 hours were significantly lighter than those of the controls. The lighter worm burdens represented reductions of 97.8 to 87.9%. A low level of protection persisted to 30 hours; mice in two groups so tested exhibited worm burden reductions of 30.8 and 57.0 percent."

[See this *Bulletin*, 1956, v. 53, 216.]

HSÜ, H. F. & AMEEL, D. J. **Intradermal Reactions to *Schistosoma japonicum* and *S. mansoni* Antigens in Schistosome Dermatitis Cases.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 841-6. [21 refs.]

Extracts of several species of schistosomes, and indeed of other flukes, can be useful in skin testing for human schistosomiasis. It has been suggested that subjects of non-human schistosome cercarial dermatitis, which is common and usually due to avian schistosome cercariae in the North American and New Zealand lake areas, may give positive skin tests with such antigens. Rabbits exposed to 3 species of avian schistosome cercariae did not give positive skin reactions with antigens made from the same cercariae, or with those of *Schistosoma mansoni*. Conflicting reports have been published of tests of *S. japonicum* antigen in human cases of non-human schistosome cercarial dermatitis.

A group of 49 patients, from the American lake region, with recent or old non-human cercarial dermatitis were injected intradermally with a saline extract antigen prepared from adult *S. japonicum*, or from the livers of snails infected with *S. mansoni*. Another 49 patients, without antecedent histories of cercarial dermatitis, were similarly treated.

Of the 49 dermatitis patients only 3 gave positive immediate-type reactions, and 36 gave delayed-type reactions with the *S. japonicum* antigen. Of 47 of these patients given the *S. mansoni* antigen only 2 gave positive immediate reactions. None of the 49 non-exposed controls gave immediate-type positive reactions, but some gave delayed type—in one case marked—with the *S. japonicum* antigen; similar results were obtained in 9 of them tested with the *S. mansoni* antigen.

It therefore seems that non-human schistosome cercarial dermatitis patients seldom give positive intradermal reactions with antigens prepared from *S. mansoni* or *S. japonicum*. Skin tests for true infections with the human schistosomes therefore are not vitiated by a previous exposure to non-human schistosome cercariae.

A. R. D. Adams

ODA, T. **Studies on Schistosome Dermatitis in the Regions along the Kiso River. I. Studies on "Endo-Kabure" and "Sobu-Make", a Paddy-Field Dermatitis, in Nagashima, Mie Prefecture.** *Mie Med. J.* 1956, May, v. 6, Nos. 1/2, 175-86, 6 figs. on 2 pls.

In the Nagashima district of the Mie Prefecture, workers in the fields, which are used for growing peas and colza in the spring and rice in the autumn, frequently suffer from a severe dermatitis, which has received a number of local names. The disease was found to be limited to persons who exposed their bare skin to the seepage water, while the distribution of the rash coincided with the areas of skin previously exposed. Among 1,158 persons whose work necessitated their coming in contact with the seepage water, 877 (76 per cent.) developed a severe pruritic dermatitis,

which interfered with sleep and was frequently associated with secondary infections. The author produces convincing evidence that the cercariae of *Gigantobilharzia sturniae*—whose intermediate host is *Polypylis hemisphaerula* and whose normal vertebrate hosts are various species of birds—are the skin-piercing parasites responsible for this condition.

R. M. Gordon

ODA, T. **Studies on Schistosome Dermatitis in the Regions along the Kiso River. II. Studies on "Suiden-Byo", a Paddy-Field Disease, in Aichi Prefecture.** *Mie Med. J.* 1956, May, v. 6, Nos. 1/2, 187-94, 1 fig. on pl. [10 refs.]

In the Aichi Prefecture there exists an infection which in all particulars, except that of the local name, appears to be clinically indistinguishable from that described by the author as occurring in the Mie Prefecture, and in the present paper Dr. Oda shows that the two diseases are caused by the same species of skin piercing cercariae (*Gigantobilharzia sturniae*).

Three chemicals—"copper sulphate, nitrolime and water soluble B.H.C."—were used, with considerable success, to control the infection.

R. M. Gordon

CHUNG, Huei-Lan, HOU, Tsung-Ch'ang & WENG, Hsin-Chih. **Further Studies on Paragonimiasis Complement Fixation Test and Cross Complement Fixation Reactions of Sera of Patients with Paragonimiasis, Clonorchiasis and Schistosomiasis to Different Trematode Antigens.** *Chinese Med. J. Peking.* 1956, May-June, v. 74, No. 3, 207-22.

The complement-fixation test in paragonimiasis [see this *Bulletin*, 1956, v. 53, 76, 77, 1361] can be improved. Antigen can be prepared in limited quantities from adult flukes obtained from the lungs of experimentally infected cats. It can be used economically by the micromethod employed as a routine in the diagnosis of rickettsia and virus infections. Tests in duplicate with Kolmer's half-volume test and the micromethod were done on the sera from 9 cases of infection with paragonimiasis, 11 patients with no trematode infection, and from 4 healthy subjects, and on the cerebrospinal fluid of 3 patients with cerebral paragonimiasis and on 2 patients with non-cerebral paragonimiasis. The micromethod is more sensitive but not less specific than Kolmer's half-volume test.

Antigen prepared from young worms is satisfactory but that from adult worms is not unless the lipid is first removed with ether. Saline extracts lose their potency even if frozen. Dried antigen was prepared, but because of the small quantity produced it was diluted with neutral sand or powdered glass which was used as a vehicle in weighing and later discarded after solution of the antigen. It remained potent for eight months in a refrigerator.

This antigen was used in investigating the sera and cerebrospinal fluid



of 51 patients suffering from paragonimiasis, 89 patients not suffering from paragonimiasis and 10 normal persons. The sera of all but one of the 51 patients and the cerebrospinal fluid of 21 of the 24 with cerebral involvement gave positive reactions. No positive reactions were given by the cerebrospinal fluid from the patients with paragonimiasis without cerebral lesions, or in patients with other diseases of the central nervous system. The antibodies in the sera were stable at room temperature for 3 months. The serum from experimentally infected cats was positive 2 to 4 weeks after the ingestion of the metacercariae of *P. westermani*.

Cross complement-fixation tests were done with antigen made from *P. westermani*, *Fasciola hepatica*, *Clonorchis sinensis* and *Schistosoma japonicum*, on patients suffering from these infections. (Dried powdered antigen was made from *F. hepatica* and *C. sinensis* by acetone extraction, since saline extracts had been found to give a large number of false positive reactions and since antigenicity is lost after ether extraction.) The sera from 28 out of 29 patients with paragonimiasis gave very strong positive reactions with *F. hepatica* antigen, and the sera from 72 patients with no trematode infection gave negative reactions. The sera from all of 25 patients with paragonimiasis gave positive reactions with *C. sinensis* antigen, and those from 12 patients with no trematode infections gave negative reactions. The sera from 26 persons suffering from paragonimiasis and 15 not suffering from this infection gave negative reactions with schistosome antigen.

When the other trematode antigens were used in complement-fixation tests on the cerebrospinal fluid of patients with paragonimiasis, negative results were obtained in those without and also those with cerebral involvement.

In an addendum it is recorded that the sera of 7 out of 17 patients suffering from leprosy gave positive reaction confirming the observations of Professor T'U PAO-CH'U, but the cerebrospinal fluid of 12, when tested, gave negative results.

W. E. Kershaw

LAVIER, G. & DESCHIENS, R. Les distomatoses hépatiques en France, leur traitement. [**Hepatic Distomatiasis in France, their Treatment**] *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3, 541-53. [18 refs.]

This is a detailed and valuable review of the occurrence in France, mainly south of the Loire, and usually associated with liver fluke disease of cattle and sheep, of outbreaks of human infections, mainly with *Fasciola hepatica*, derived from snail intermediate hosts present in water-cress beds. The infection is acquired chiefly by families or small communities, when they eat contaminated water-cress. Infection with *Dicrocoelium dendriticum* also occurs, but is only occasional. Only 5 instances are known in France and only 100 in all have been recorded. Infection with this species depends on ingestion of the ants, *Formica*

*fusca* and *F. rufibarbus* which are the second intermediate hosts, these being present in fallen fruit or other material eaten.

The authors review the literature on outbreaks of the infection in France and discuss the pathology, symptoms, clinical forms, diagnosis, prognosis, treatment and prophylaxis of the disease. The disease may last 3-10 years. In the first phase, when the young flukes are invading the liver, the symptoms may, if the infection is severe, be those of a severe infectious disease, with enlargement of the liver, hepatic pain and a leucocytosis of 13,000 to 35,000 per cmm. with an eosinophilia of 59 to 80 per cent. This stage may last 3 to 4 months during which there are no eggs in the faeces because the flukes are not adult. Diagnosis is helped by examination of the blood and by intradermal and complement-fixation reactions. The second phase, when the flukes are in the bile ducts, is characterized by asthenia, slight anaemia and a decreasing eosinophilia, which, however, never disappears, 5 to 6 per cent. of eosinophils having been found 10 years after the infection. Biliary colic and lithiasis may now occur. Diagnosis at this stage may be made by examination of material obtained by duodenal intubation for the eggs, which towards the end of the infection become very rare. Duodenal intubation obviates error due to the finding of eggs derived from infected livers of sheep or goats which the patient may have eaten.

Prognosis is not bad, mortality being slight.

For treatment during the first phase the authors recommend emetine hydrochloride, given intramuscularly in doses of 20 to 80 mgm. a day for 8 to 10 days, or in one or two series with rests between. They quote several papers on the use, during the second phase, of antimonial and arsenical drugs and intravenous injection of gentian violet. But there is no specific drug that is effective. Prophylaxis depends on the avoidance of contaminated water-cress.

The paper itself should be read.

(See also Lavier, *Encyclopédie médico-chirurgicale*, 1950, Article No. 7029.)

G. Lapage

LÄMMLER, G. Die Chemotherapie der Fasciolose. II. Mitteilung. Über vergleichende experimentell-chemotherapeutische Untersuchungen an der Leberegelkrankung des Kaninchens. [**The Chemotherapy of Fasciola Infections. II. Experimental Chemotherapeutic Studies in Fasciola Infections in Rabbits**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1956, v. 7, No. 3, 289-311, 2 figs. [Numerous refs.]

The English summary appended to the paper is as follows:—

“In reviewing the chemotherapy of *Fasciola hepatica* infection necessity of animal experiments to control or rectify in vitro tests is pointed out. The author's research on fasciolosis in rabbits shows that hexachlorethane is to be given preference to carbon tetrachloride in spite of a lower chemotherapeutic index. Emetine hydrochloride proved

inactive in animal experiments. Hexachlorethane should be considered the remedy of choice for veterinary purposes."

PYLKKÖ, O. O. **Studies of the Acetylcholine Content and Cholinesterase Activity of the Human-Pathogenic Fish Tapeworm (*Diphyllbothrium latum*).** *Ann. Med. Exper. et Biol. Fenniae.* 1956, v. 34, Suppl. 8, 81 pp., 4 figs. [Numerous refs.]

MYRSETH, O. Echinokokk-Sykdommen i Finnmark. [**Hydatid Disease in Finnmark**] *Tidsskr. f. d. Norske Laegeforening.* 1956, Nov. 15, v. 76, No. 22, 867-71, 17 figs. English summary (6 lines).

*Echinococcus granulosus* may be fairly common in the far North of Norway, for in recent years 10 patients with echinococcus cysts in the lungs have been admitted to a tuberculosis hospital in Finnmark. Reporting on these cases, Myrseth notes that their diagnosis depended largely on X-ray examinations of their chests and on the Casoni test,—the intracutaneous injection of material obtained from an echinococcus cyst. This material has been obtained from Iceland and, most recently, from Yugoslavia. The reaction is checked as with a Mantoux test and is taken as positive when rubor develops in the course of 10 minutes. In most of Myrseth's complicated cases a positive reaction was obtained with this test. He suggests that the degree of infestation of a given area with *Echinococcus* may well be gauged by a systematic application of the Casoni test. Such a survey would be the better for cooperation between the health authorities of Norway, Finland and Sweden. Myrseth is sceptical as to the value of an echinococcus complement-fixation test which has been investigated with disappointing results at the State Serum Institute in Copenhagen. The intermediate hosts of this taenia in the North of Norway are the reindeer and the dog, the salt-hungry reindeer licking snow soiled by the infected urine of dogs. Myrseth argues that the systematic destruction of infected meat and offal and the administration of vermicides to infected dogs should ultimately prove successful.

Claude Lillingston

WOLFGANG, R. W. & POOLE, J. B. **Distribution of *Echinococcus* Disease in Northwestern Canada.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 869-71.

*Echinococcus* disease is well known in wild carnivores in northern Canada and studies of the hydatid problem there have already been made [see MILLER, this *Bulletin*, 1953, v. 50, 1065]. The relation between sylvatic hydatid disease and man is particularly important among the Indians and Eskimos in the northwest, because of the part played by sled dogs and wild herbivores in their economy.



The present authors prepared an antigen from reindeer hydatid fluid, and this was found to produce a strong reaction with a dose of 0.1 ml. intradermally in proved or suspected cases of the disease. With its use, they made a survey in 1954-1955 among the indigenous people of the Yukon and of the MacKenzie district of the North-West Territory. In the 2 years positive reactions were found in 31 per cent. of 2,022 persons.

In the Indian Health Services hospital for the area at Edmonton, Alberta, 180 cases of hydatid were recorded (71 liver, 109 lungs). In one area in which Miller had obtained no positive results in 229 Indians with an Australian antigen, the present authors obtained 20 per cent. of positives in 198 Indians with the new Canadian antigen. As far as could be ascertained, there were no false negative reactions.

The main reservoirs of *Echinococcus* [the authors state that the local species is in doubt and use the generic name] in the wild life cycle seem to be the wolf, and such herbivores as moose, elk, caribou and reindeer. One of the present authors examined 27 Indian dogs and found 7 infected.

Many Indian bands rear captured wolf cubs with their own dogs and allow their dogs to eat the viscera of herbivores. On the basis of the skin tests, it appears that there are in Yukon some 500 cases of past or present hydatid disease and in MacKenzie district over 900. If this is correct, Yukon has almost as many, and MacKenzie district far more, cases than have been recorded for the entire United States.

H. J. O'D. Burke-Gaffney

BALMÈS, A. & VINCENT, P. Les réactions biologiques de l'hydatidose. [**Biological Reactions in Hydatid Disease**] *Montpellier Méd.* 1956, Sept.-Oct., v. 50, No. 2, 244-8.

BALMÈS, A. & THÉVENET, A. Les aspects radiologiques du kyste hydatique du poumon. [**Radiological Aspects of Hydatid Cysts of the Lung**] *Montpellier Méd.* 1956, Sept.-Oct., v. 50, No. 2, 233-43, 4 figs. & 1 diagram. [15 refs.]

ACQUAVIVA, R., THEVENOT, C. & VERTUT, J. Echinococcose thyroïdienne. [**Hydatid Disease of the Thyroid Gland**] *Maroc. Méd.* 1956, Oct., v. 35, No. 377, 995-6.

RAPER, A. B. & DOCKERAY, G. C. **Coenurus Cysts in Man: Five Cases from East Africa.** *Ann. Trop. Med. & Parasit.* 1956, June, v. 50, No. 2, 121-8, 1 fig. on pl. & 1 text fig. [24 refs.]

"1. Five cases of coenurus cysts in man are recorded from Kenya and Uganda.

"2. Three of the five cysts were found in hitherto unrecorded sites—two beneath the conjunctiva and one in the eyeball.

"3. The clinical and parasitological aspects of 24 human infestations with coenurus are analysed.

"4. Consideration is given to the species of *Multiceps* concerned. Evidence based on the morphology of the larvae is equivocal, and that based on the anatomical site is indecisive; but attention is drawn to notable differences in the disease as between South Africa and tropical Africa, which, if confirmed, would indicate that the epizootic background is different in the two regions."

BOASE, A. J. **Coenurus Cyst of the Eye.** *Brit. J. Ophthalm.* 1956, Mar., v. 40, No. 3, 183-5, 3 figs.

Parasitization of the human eye by the "gid" worm (genus *Multiceps*) has not previously been recorded. The author describes two cases of coenurus cyst of the eye in Uganda; one cyst occupied the vitreous body and the other was situated beneath the conjunctiva. *D. P. Choyce*

THORSON, R. E. **The Stimulation of Acquired Immunity in Dogs by Injections of Extracts of the Esophagus of Adult Hookworms.** *J. Parasitology.* 1956. Oct., v. 42, No. 5, 501-4.

VOÛTE, A. D. De levensduur van eieren van *Ascaris lumbricoides* L. in de grond. [**Survival of *Ascaris lumbricoides* L. Eggs in Soil**] *Nederl. Tijdschr. v. Geneesk.* 1956, Sept. 29, v. 100 (iii), No. 39, 2790-92. [10 refs.] English summary (8 lines).

Batches of 50 eggs of *Ascaris lumbricoides* were kept at 18°C. in different types of soil, and after 2 months the number of eggs which could be recovered was determined in each case. The average recovery of eggs kept in sand was around 45, but recovery was much lower in garden soil (25), leaf mould (16.5) and clay (5.6). Eggs kept in water extracted from clay and leaf mould developed normally for a month and then degenerated. Losses of eggs were much lower in garden soil, leaf mould and clay containing 4 per cent. formaldehyde (recoveries of 40, 35.6 and 27 respectively), and it was therefore concluded that the eggs were destroyed by the activity of bacteria. Eggs placed in a compost heap in which the temperature did not exceed 30°C. contained living embryos after 1 month, but after 2 months most eggs had degenerated and some had burst. Samples of earth from market gardens which had been heavily manured with sewage 2 months previously contained around 10 eggs of *A. lumbricoides* per litre, but no eggs were found in samples taken 3 months later; the soil evidently exerted a lethal effect upon the eggs during the season in which green vegetables were grown, and it was therefore unlikely that the gardens could be a source of infection.

*D. J. Bauer*

TROELSTRA, J. A. & VOÛTE, A. D. Infectiebronnen van *Ascaris lumbricoides* L. [**Sources of *Ascaris lumbricoides* L. Infection**] *Nederl. Tijdschr. v. Geneesk.* 1956, Nov. 24, v. 100 (iv), No. 47, 3426-30. [12 refs.]

The English summary appended to the paper is as follows:—

“In some parts of eastern Groningen the roundworm infection is a familial infection, i.e. the source infects all members of a household and arises mostly as a result of an infection of the family.

“The extent of involvement depends on domestic hygiene and the use of human excreta for manuring the kitchen garden, although the latter is a minor source of infection, as the eggs die very soon.

“If the faeces are used as manure, the cesspits are usually emptied once or twice a year. Poor hygiene may allow them to become brim full, thus keeping the faeces within the children's reach for a considerable period. Eggs may remain after a pit has been emptied; ripe eggs have been found on such privies.

“Better hygiene in the use of privies will eliminate most of these risks.”

HOSHINO, M. & SUZUKI, H. **Studies on the Developing Media for the Eggs of *Ascaris*. I. Respiration of the Eggs of *Ascaris lumbricoides* var. *suilla*.** *Fukushima J. Med. Sci.* 1956, June, v. 3, No. 2, 51-6, 7 figs.

WANG, Hsün-Chiung, T'ANG, Chih-Hsi, LIU, Hsiao-Hsien & KAO, Hsin-Min. **Biliary Ascariasis. An Analysis of 141 Cases.** *Chinese Med. J. Peking.* 1956, Sept.-Oct., v. 74, No. 5, 445-55.

The first author found, in an investigation of 1,347 children in Tsingtao, that 65 per cent. of those over 4 years of age had ascariasis; other workers found that 92.4 per cent. of the adults in the same district were infected. The authors have operated on 141 patients with biliary ascariasis during the last 6 years; among these 14 (9.9 per cent.) had concomitant biliary calculi with living or dead ascarids; in 4 cases examination of the stone by serial sections showed a nucleus of dead *Ascaris*. In all the 141 patients ascarids were found in the biliary ducts and in 4 patients in the gall bladder also; the majority had 1-5 worms, but about 10 per cent. had over 10, and in one patient 48 were found, mostly mature worms which had migrated from the intestine. There were 63 male patients and 78 female; ages varied from 5 to 58 years; 38.3 per cent. were children between 5 and 12 years old. Most patients (33 per cent.) came to hospital after 4-10 days of illness, but one patient had a 3 months' history of symptoms and a living worm was found in the common bile duct at operation. Ordinarily the life expectancy of *A. lumbricoides* in the intestine is about one year.



The earliest symptom of invasion of the bile duct is continuous colicky pain in the upper abdomen, with short periods of remission, due to spasm of the sphincter of Oddi; later, when the worm has passed completely into the bile duct, the sphincter is relaxed and the pain becomes intermittent and less severe. If the worm dies in the duct the pain disappears. In uncomplicated cases there was no rigidity of the abdominal wall, but there was a fixed point of tenderness below and to the right of the xiphoid process. The authors found *Ascaris* ova in the bile obtained by duodenal suction after injection of magnesium sulphate to stimulate the flow of bile. In 22 per cent. of the patients pain was referred to the shoulder and back; jaundice did not occur unless the ascariasis was complicated by gall stones in the common duct or by cholecystitis; one patient had 33 worms in the bile duct for one month without any jaundice. The leucocyte count was below 13,000 per cmm. in 55 per cent. of the patients and eosinophilia was present in only 11 cases; infections of the biliary tract were present in 17 per cent.

The authors are of opinion that the worms seldom wander back to the duodenum once they have entered the bile duct, so that if symptoms persist after a short period of observation, operation should be performed. Pregnant women near term were treated by sedatives and antispasmodics in order to postpone operation till after labour. At operation choledochotomy is advised for all patients in whom the symptoms suggest biliary ascariasis, even when the worms cannot be palpated in the duct, as the attempt to squeeze them back into the duodenum is difficult and may lead to worms being left behind in the hepatic duct. Santonin 2 per cent. in absolute alcohol is recommended as an anthelmintic; 0.5 ml. of this solution, diluted in 50-100 cc. of saline, is administered during operation through a catheter passed into the duodenum. There were 4 deaths in the authors' series, 2 of which occurred during operation.

W. L. Harnett

COCKER, W. & McMURRY, T. B. H. **The Chemistry of Santonin. Part II. Preparation of some Derivatives with possible Anthelmintic Activity.** *J. Pharmacy & Pharmacol.* London. 1956, Dec., v. 8, No. 12, 1097-1102. [14 refs.]

"1. A number of derivatives of santonin incorporating the  $\beta$ -methyl group at C(10), the ketonic group or its equivalent at C(3), and the intact butanolide fused at C(6)-C(7) to the bicyclic system have been synthesised.

"2. These derivatives were related to non santonin-like compounds which have anthelmintic activity.

"3. The combination of features of the santonin molecule might reasonably have been expected to produce activity. Preliminary screening tests have unfortunately shown no promise of such activity."

ATCHLEY, F. O., WYSHAM, D. N. & HEMPHILL, E. C. **Mass Treatment of Ascariasis with a Single Dose of Piperazine Citrate.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 881-7, 1 fig. [15 refs.]

"Single doses of piperazine citrate were administered during mass treatment of human ascariasis in five study areas in the mountains of eastern Kentucky. A total of 282 persons was treated in four groups with three different dosage schedules, two groups receiving a laxative after treatment. In the more successful laxative group, 64 per cent of the individuals had egg counts reduced to zero as determined by observations before and after treatment. However, in another group omitting the laxative, a cure rate of 79 per cent was obtained. Reports of side effects were few and judged to be of little concern. Piperazine citrate in single dosage is considered an effective public health measure for use in control of roundworm infections."

GORDON, R. M. **The Essential Data required in a Filariasis Survey.** *Ann. Trop. Med. & Parasit.* 1956, Sept., v. 50, No. 3, 319-21.

Attention is drawn to the need for fuller information obtainable during the course of filariasis surveys, in order that a better understanding of the epidemiology of the infection may be reached. A number of suggestions are made, some or all of which might be included in future surveys.

With regard to the parasite in man, the incidence of infection is less important than a knowledge of the proportion of the population harbouring microfilariae in numbers capable of infecting vectors. The density of vectors and their infection rate should be estimated, and in addition the intensity of their infection should be determined because the number of parasites introduced by the vector probably influences the course of infection. An attempt should be made to assess whether the parasite has any effect on the vector, such as affecting its movements, feeding habits or longevity. Equally the pathogenicity of the filaria to the vertebrate host should be studied. The discovery that man is not the sole vertebrate host of *Loa loa*, and the indication that this may be true also of *Wuchereria malayi*, suggests that there may be a "wild" cycle of infection dependent on hosts other than man and on vectors other than those captured feeding on man. This possibility should be investigated since its existence would have an important bearing on control.

T. H. Davey

IYENGAR, R. Développement de *Wuchereria bancrofti* (Cobbold) et de *Wuchereria malayi* (Brug). (I<sup>re</sup> partie.) [**Development of *Wuchereria bancrofti* and *W. malayi***] *Ann. Parasit. Humaine et Comparée.* 1956, Jan.-Mar., v. 31, Nos. 1/2, 99-138, figs. 1-31. (II<sup>e</sup> partie.) *Ibid.*, Apr.-June, No. 3, 266-87, figs. 32-43. [Numerous refs.]

This work is a repetition of the detailed studies previously carried out by FENG with *W. malayi* [this *Bulletin*, 1934, v. 31, 805] and KOBAYASI

with *W. bancrofti* [*ibid.*, 1941, v. 38, 149]. The material used consisted of fresh blood and dried smears for microfilariae and for studies of developing larvae, sections and dissections of the mosquitoes, *Culex fatigans* and *Mansonia (Mansonioides) annulifera*, were employed. In some respects the paper is unnecessarily long and the author's summary therefore is freely translated below in part only.

While in the thoracic muscles the larva feeds by absorbing food through its cuticle. It does not feed at the expense of the thoracic muscles, as certain authors maintain.

We observed that, in the thorax of the mosquito, certain larvae tend to become surrounded by a deposit of chitin. From isolated points the chitin spreads gradually until it forms a sheath enclosing the larva entirely. This encapsulation might be regarded as a defence mechanism of the mosquito against the parasites.

Experiments were carried out to determine if the mature larva could penetrate human skin. We concluded that penetration by the larva is impossible whether it is placed on intact skin, scarified skin or on skin which has been punctured by a needle to simulate a mosquito bite. It is believed that penetration occurs only from the labium of the mosquito.

We have shown that the oesophagus of the larva is derived from cells situated [in the microfilaria] in front of and behind the excretory cell.

The G2 and G3 cells divide several times and give rise to a column of cells which form the mid intestine [large intestine].

The posterior intestine [rectum] is formed from four cells derived from the G4 cell.

The genital primordium is formed by the G1 cell.

[In the opinion of the abstracter, the most interesting part of this study is the author's new interpretation of the fate of the G cells of the microfilariae, whereby the G1 cell becomes the genital primordium, the G2 and G3 cells give rise to the intestine and the G4 cell to the rectum. This seems to be more acceptable than the previous interpretation that all four G cells are employed only in building up the rectum.

The experiments to determine if the mature larvae can penetrate human skin seem much too limited in scope and in number to justify the conclusions which are drawn from them.]

J. J. C. Buckley

ROWLANDS, Anne. **The Distribution of Microfilariae of *Wuchereria bancrofti* in Human Organs.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Nov., v. 50, No. 6, 563-4.

The distribution of the microfilariae of *W. bancrofti* in human organs was studied by counting the microfilariae in histological preparations and applying a conversion factor (from 2 dimensions to 3 dimensions) according to the method of HAWKING and THURSTON [this *Bulletin*, 1952, v. 49, 1141]. The material was obtained from the body of an adult African man who died after brief illness in the Gold Coast.



The results were as follows:

Lungs	1,815	mf.	per 100 cmm.	(417,000	mf.	per kgm.	body weight)
Cardiac muscle	2,520	"	"	"	"	(181,000	per kgm.)
Liver	723	"	"	"	"	(217,000	"
Kidney	411	"	"	"	"	(28,000	"
Brain	207	"	"	"	"	(52,000	"
Small intestine	90	"	"	"	"	(18,000	"
Pancreas	99	"	"	"	"	(1,000	"

The lungs contained more than twice as many microfilariae as any other organ. The cardiac muscle showed the greatest density of microfilariae; possibly this was due to release of microfilariae from the lungs shortly before and after death. It is not possible to correlate the distribution with any particular phase of the periodic cycle. The general picture agrees broadly with that found in monkeys and dogs by Hawking and Thurston [*loc. cit.*].

F. Hawking

PATTANAYAK, S., RAGHAVAN, N. G. S. & KRISHNASWAMI, A. K. **Microfilariae in Domestic Fowls.** *Indian J. Malariology.* 1956, Sept., v. 10, No. 3, 261-3, 1 pl.

WANSON, M. Biotoques des simules congolaises vectrices d'*Onchocerca volvulus* et prophylaxie de l'onchocercose humaine. [**Biotypes of Simulium Vectors of Onchocerca volvulus in the Belgian Congo and Prophylaxis of Onchocerciasis**] *Ann. Mus. Roy. Congo Belge.* (4° Sci. Zool.) (n.s.) 1954, v. 1, 564-8.

The author states that in Uganda GIBBINS discovered a "race" of *Simulium damnosum* which did not attack man, but took its blood meal only from birds. This "race" was found in the Belgian Congo inhabiting small rivers of Kasai, Ruanda and streams in the neighbourhood of Léopoldville. Pupae from these small water-courses were taken to the laboratory and the adults which issued from them fed willingly on birds but refused to bite man or other mammals. Pupae from the rapids yielded flies which fed indiscriminately on man, mammals or birds.

The pupae in the small rivers are attached close to the surface (at a depth of 2 to 25 cm.) on dead leaves, the roots of riverine vegetation, dead wood, etc.

It is suggested that the explanation of the different feeding preferences of the adult *S. damnosum* may lie in the speed of the current in which the larvae occur. There is some morphological variation between the different "races"; the respiratory filaments of pupae taken from the rapids rarely exceed 6 in number, while those of the pupae in small rivers are longer and the number varies from 8 to 12. The author suggests that

these modifications may be related to the different oxygen content of the water of the rapids and the small rivers. It is also suggested that the food of the two types of larvae may be different.

Although there is a variation in the feeding habits of the adults, the cycle egg to adult lasts 9 days, regardless of season or location. The remainder of the paper deals with methods for the control of onchocerciasis [this *Bulletin*, 1950, v. 47, 647].

G. Crisp

CRISP, G. **An Ephemeral Fauna of Torrents in the Northern Territories of the Gold Coast, with special reference to the Enemies of *Simulium*.** *Ann. Trop. Med. & Parasit.* 1956, Sept., v. 50, No. 3, 260-67. [12 refs.]

The author spent 3 years in the Northern Territories of the Gold Coast investigating the habits of *Simulium damnosum*. During this time he made a brief survey of the communities of animals living in the torrential parts of the Red Volta and the Nasia rivers in order to determine the natural enemies of *Simulium*. Three species, *S. damnosum*, *S. adersi* and *S. medusaeforme* form *hargreavesi* bred in the Red Volta area, but in the Nasia area only the first two occurred (December to February).

The species of animals (mostly insects) collected from the two rivers are listed according to their effectiveness as enemies of all stages of *Simulium* in general, irrespective of species. The aquatic larvae and nymphs of several insects are carnivorous and devour the larvae of *Simulium*; dragonflies are most important predators of the adults. Besides insects, fish are enemies of *Simulium* larvae, spiders may attack the adults and crustacea may have a disturbing effect among *Simulium* eggs. Three tables of figures indicate certain seasonal changes in numbers of some of these predators.

As the paper is mainly in the form of notes, interested readers should consult the original, which gives the scientific names of the creatures concerned and details of the collecting methods.

H. S. Leeson

LAVIER, G., LAGRAULET, J. & D'HAUSSY, R. Étude anatomo-pathologique d'un oeil présentant une chorio-rétinite onchocerquienne. [**Pathological Study of a Case of Onchocercal Chorio-Retinitis**] *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3, 434-8, 8 figs. on 2 pls.

Knowledge of the ocular complications of onchocerciasis is handicapped by lack of suitable pathological material for examination. Considerable attention must therefore be paid to this exhaustive account of the histopathological appearances in the case described.

The patient, aged 55, had numerous onchocercal cysts around the iliac crests, a typical skin rash, and negative serological tests for syphilis. Before death the ocular signs were also typical of onchocerciasis, viz., nummular keratitis, signs of a chronic plastic iritis with pear-shaped

pupil, and the fundus showing large areas of retinal and choroidal atrophy and retinal pigmentation.

The main pathological feature of the excised eye was of vascular lesions dominating the picture. No microfilariae were found anywhere in the eye. The vascular lesions at the limbus were comparatively recent, but those of the retina and choroid appeared much older. The veins were involved more than the arteries. Having drawn attention to this phenomenon, the authors regard this appearance as supporting the theory that the choroidoretinal changes are due to a toxic cause rather than direct invasion by microfilariae. It is possible that the therapeutic larvicides may provoke these toxic inflammatory responses in the eye.

D. P. Choyce

ONABAMIRO, S. D. **The Early Stages of the Development of *Dracunculus medinensis* (Linnaeus) in the Mammalian Host.** *Ann. Trop. Med. & Parasit.* 1956, June, v. 50, No. 2, 157-66, 8 figs. on 2 pls. & 1 text fig. [12 refs.]

"1. A method is described for obtaining in Nigeria suitable numbers of cyclops to transmit guinea-worm infection to dogs, the experimental host animal.

"2. The early stages of the worm in the mammalian host was studied in three phases: phase one resulted in the recovery of fully developed female worms after a period of about a year; phase two resulted in the recovery of mature worms of both sexes at the age of 3-4 months; and phase three resulted in the recovery of male and female worms aged 43-48 days, some of which were in the process of undergoing their fourth ecdysis.

"3. Observation suggests that the route of the larval worms from the alimentary canal to the subcutaneous tissue of the mammalian host is probably through the lymphatic system.

"4. The worms reach the subcutaneous tissue by the 43rd day, or possibly a little earlier.

"5. In the subcutaneous tissue the sexes are in about equal numerical proportions and sexual differentiation is distinct, though the males have not yet begun to develop spicules.

"6. The final ecdysis takes place in the subcutaneous tissue.

"7. By the 48th day the worms are still unfertilized.

"8. It is suggested that the hooked-tailed larvae obtained from some specimens of adult guinea-worms in India represent a mere anatomical abnormality of no specific significance, and that they do not represent a sexual differentiation in the early larval forms.

"9. Doubt is expressed whether yet earlier stages of *Dracunculus medinensis* can be recovered from the tissues of experimental host animals until methods more precise than those used in the present work have been devised."



COUTELEN, F., BIGUET, J., CAPRON, A., DEBLOCK, S. & LANGINIEUX, J.  
L'oxyurose dans le nord de la France chez des adultes de plus de  
soixante ans. [**Enterobiasis in the North of France in Adults over  
60 years old**] *Bull. Soc. Path. Exot.* 1956, May-June, v. 49, No. 3,  
464-7.

MAZZOTTI *et al.* [*Rev. Inst. Salubridad y Enfermedades Trop.*, 1943, v. 4,  
273; this *Bulletin*, 1944, v. 41, (306)] found in Mexico that 5 per cent.  
of 500 adults over 60 years old were infected with *Enterobius*; this was  
the only reference the present authors could find to surveys of the  
incidence of enterobiasis in old people.

They themselves did one examination only by the Graham adhesive  
tape method on 950 adults living in 4 institutions in France. There were  
356 men and 594 women aged from 60 to 99 years. The incidence varied  
from 0 to 79 per cent. (the highest percentage being found only in 24  
men in a Douai hospice) and it varied according to the rooms occupied by  
the inmates, possibly in relation to their hygienic habits and social status.  
In persons of both sexes the highest incidence (31.06 per cent. of 132  
patients) was at a Douai institution and the lowest (6 of 58 persons of  
both sexes) at Sin-le-Noble, the average incidence being 20.10 per cent.  
Earlier work by Coutelen *et al.* (*Echo Médical du Nord*, 1954, v. 25,  
428) indicates that, if 3 examinations had been made, the incidence would  
have been about 10 per cent. higher. A table shows the percentages of  
positives in men and women in each institution.

The incidence was independent of age and sex. In aged people the  
infection tends to be hidden and it is rare to find more than a few eggs  
in each preparation; the authors think that there are few worms present  
and that the eggs are dispersed on the anal skin or are wiped away. One  
woman aged 99 was infected, and Mazotti *et al.* (*loc. cit.*) found the  
infection in Mexico in a woman aged over 100. The authors conclude  
that there is no upper age limit beyond which the infection does not  
occur.

The infection does not cause appreciable symptoms and is habitually  
ignored by the patients.

G. Lapage

PAWŁOWSKI, Z. & RYDZEWSKI, A. Piperazyna w ambulatoryjnym leczeniu  
owsicy. [**Piperazine in Ambulatory Treatment of Enterobiasis**]  
*Wiadomości Parazytologiczne*. Warsaw. 1956, v. 2, No. 5, 271-82.  
[50 refs.]

The English summary appended to the paper is as follows:—

“About 3,200 cases of enterobiasis were ambulatorially treated with  
*Piperazinum effervescens* and *Piperazinum hexahydratum* in a dosage of  
5-50 mg/kg of body weight/24 hours. Controlled were 1,119 persons in  
the way of N.I.H. smears, in periods of 1 week to 1 year after treatment.  
The efficiency of a cure accomplished at three intervals ranged from 51

per cent to 84 per cent. It results from our observations that [the] deciding [factor] for the efficiency of the cure appeared not to be the quantity of the daily dose but the duration of the treatment. We think that in cases of intensive invasions of *Enterobius vermicularis* there are to be applied at least three 7-days treatments with 10 days interruptions by administering *Piperazinum hexahydratum* in doses not exceeding 50 mg/kg/24 hours."

JUNG, R. C., EMERSON, S. M. & SEWELL, B. **Chemoprophylaxis of Enterobiasis.** *Pediatrics*. Springfield, Ill. 1956, Nov., v. 18, No. 5, 762-6.

"The efficacy of piperazine citrate used therapeutically and prophylactically against enterobiasis was studied in a home for boys aged 4 to 14 years all infected with pinworm.

"Syrup of piperazine given in a dose of 5 ml three times daily for 1 week failed to cure 5 of 24 boys but given for 14 days it failed in only 1 of 25. Tablets of piperazine given in a dose of 500 mg three times a day for 1 week failed to cure 4 of 23 boys. Of 28 children receiving no treatment 25 were positive during the test period.

"Syrup of piperazine given weekly in a single dose of 15 or 45 ml apparently prevented reinfection in 11 of 23 and 12 of 19 boys respectively. All of 22 controls who received no prophylactic medication became reinfected.

"The reduction of reinfection among those receiving prophylactic piperazine consisted of a decrease not only in the number of individuals reinfected but also in the intensity of the reinfections that occurred. No signs or symptoms of intoxication due to piperazine were noted."

LARSH, J. E., JR., RACE, G. J. & JEFFRIES, W. B. **The Association in Young Mice of Intestinal Inflammation and the Loss of Adult Worms following an Initial Infection with *Trichinella spiralis*.** *J. Infect. Dis.* 1956, July-Aug., v. 99, No. 1, 63-71, 6 figs.

"Young mice given an initial infection with *Trichinella spiralis* lost a significant number of adult worms between 15 and 17 days after infection. Related to this loss of worms was the development in the intestinal tissue of a characteristic cellular reaction, which reached its peak at 11 days after infection. Evidence is presented to show that this reaction, differing only in the time of its initiation and in degree from that in old mice given one infection and in those strongly immunized by prior infections, is a manifestation of acquired immunity. Therefore, these results indicate that following initial infection of young and old mice the slower elimination of adult *T. spiralis* from the young mice is due to their inability to develop acquired immunity as rapidly as the old mice." [See also this *Bulletin*, 1954, v. 51, 1088.]

COKER, C. M. **Effects of Cortisone on Cellular Inflammation in the Musculature of Mice given One Infection with *Trichinella spiralis*.** *J. Parasitology*. 1956, Oct., v. 42, No. 5, 479-84, 6 figs. on 3 pls.

"Daily cortisone treatment of mice for 30 days after an initial infection with *Trichinella spiralis* resulted in almost complete suppression of the normal cellular infiltration into the musculature in response to invading larval worms. A shorter period of treatment with cortisone, terminating on the 13th day after infection, did not prevent the development of a striking general myositis as measured at 21 and 30 days after infection. Despite this striking cellular response there was not a reduction in the number of larvae recovered from the musculature. Therefore, if this response is related to an immune action against the larvae, it requires longer than 30 days to produce demonstrable effects."

[See this *Bulletin*, 1956, v. 53, 644.]

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## DEFICIENCY DISEASES

HOLMES, E. N. C. **Energy Balance Sheets.** *East African Med. J.* 1956, Sept., v. 33, No. 9, 345-52.

It is pointed out that dietary surveys can only give a measure of the energy intake of a man. This may not be the same as the energy requirement which can be assessed more accurately by measurements of energy expenditure. Recent European work on methods of measuring energy expenditure by indirect calorimetry is reviewed.

Results obtained in Europe may not be applicable in Africa. African women visiting a shamba [cultivated field] may do hard work climbing up and down hills with heavy loads. Such a journey may involve the expenditure of 1,200 Cal. and this is in addition to the energy required for ordinary domestic duties.

Failure to balance energy intake and expenditure must result in changes in body composition.

R. Passmore

TANNER, R. E. S. **A Preliminary Enquiry into Sukuma Diet in the Lake Province, Tanganyika Territory.** *East African Med. J.* 1956, Aug., v. 33, No. 8, 305-24.

This is an account of the dietary habits and customs of a group of pastoral agriculturalists in Tanganyika. Millets are the staple food, but rice and maize are also eaten. Cassava is a valuable reserve crop, as it is resistant to drought. Meat is consumed frequently but irregularly. A variety of country beers are brewed. A list is given of 16 vegetables and



17 wild fruits consumed. There is no overt malnutrition and the people are probably well fed.

Food taboos are described and discussed and a list of 24, which were encountered, is given. They include "to brew beer when the moon is new"; "to eat green vegetables when protective medicine has just been given"; "to eat porridge with tamarind fruits," etc. For the most part these would not seriously interfere with dietary intake. The need for a combination of dietary and sociological studies is stressed. *R. Passmore*

GÓMEZ, F., RAMOS GALVÁN, R., CRAVIOTO, J., FRENK, S., VÁZQUEZ SANTAELLA, Judith & DE LA PEÑA, Carmen. **Fat Absorption in Chronic Severe Malnutrition in Children.** *Lancet*. 1956, July 21, 121-2, 2 figs. [13 refs.]

The absorption of fat was measured in 14 children with the signs and symptoms of severe chronic malnutrition. Studies were carried out in each child on admission and later in convalescence and in 10 patients also after a week's treatment in hospital. Intake of fat minus faecal fat was taken as "absorption".

Absorption was abnormal in cases of malnutrition in infants although not all had macroscopic steatorrhea (up to half the intake). During recovery 80 per cent. of fat was absorbed.

Larger intakes were associated with better absorption both during malnutrition and in recovery (after six weeks' dietary treatment).

The authors conclude that in view of the significant correlation between absolute values of intake and absorption "... it seems useful to insist that the long-established practice of either reducing or suppressing the intake of fat in steatorrhea, particularly in malnourished children, seems to be unnecessary and might even be undesirable". *B. G. Macgrath*

DE MEIRA, M. T. V. & DE SOUSA, H. T. Um caso de Kwashiorkor observado em S. Vicente (Cabo Verde). [**A Case of Kwashiorkor in Saint Vincent**] *Anais Inst. Med. Trop.* Lisbon. 1956, Sept., v. 13, No. 3, 433-9, 6 figs. on 3 pls. English summary (6 lines).

THOMSON, I. G. **Kwashiorkor in Northern Nigeria.** *West African Med. J.* 1956, Sept., v. 5 (n.s.), No. 3, 121-30, 3 figs. [24 refs.]

Kwashiorkor is reported to be present among the Hausa people in Northern Nigeria. However, the disease is not common. Most of the children get a little milk after weaning and are fed on cereals such as millet and guineacorn which contain more protein than cassava, the staple food among the people of Lagos, where kwashiorkor is commoner. Marasmus is common among one-year-old children in the north, probably owing to the poor supply of maternal milk. *R. Passmore*

HANSEN, J. D. L., HOWE, E. E. & BROCK, J. F. **Amino-Acids and Kwashiorkor.** *Lancet.* 1956, Nov. 3, 911-13. [11 refs.]

This paper provides the protocols of the experiments briefly reported in a footnote to a previous paper [BROCK *et al.*, this *Bulletin*, 1956, v. 53. 231] showing that initiation of cure in kwashiorkor can be effected by a diet consisting of a mixture of 18 amino-acids (60 per cent. of the diet), glucose and a salt mixture. Besides clinical improvement, nitrogen retention and a rise in serum albumin were demonstrated. There can now be no doubt that the essential factor in kwashiorkor is a deficiency of either specific amino-acids or nitrogen.

A higher proportion of positive responses was obtained when vitamins were added to the mixture and these are certainly necessary for a complete cure in many patients. This demonstration that amino-acids *alone* can initiate cure, will be of great importance in assessing the nutritive value of diets in relation to the incidence of kwashiorkor. *R. Passmore*

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## SPRUE

GARDNER, F. H. **A Malabsorption Syndrome in Military Personnel in Puerto Rico.** *Arch. Intern. Med.* 1956, July, v. 98, No. 1, 44-60, 7 figs. [28 refs.]

Studies were made on a group of 21 military patients aged 22 to 47 years, 19 males, 2 females. All had suffered from diarrhoea at intervals for one to 12 months before examination. Stools were watery, frothy and offensive, or mushy. They were not pale and there were 2-10 in the day. All patients complained of anorexia and dyspepsia. Many had occasional abdominal cramps. Only 3 had glossitis. The blood picture in all was normal. Liver function was normal (blood bilirubin, thymol turbidity and bromsulphthalein excretion). Loss of weight varied from 5 to 40 pounds. All appeared well nourished and the dietary history was good.

Examinations included barium meals, oral glucose and D-xylose tolerance tests, oral vitamin A absorption test, tolerance tests for butter fat, fat-absorption tests, iron absorption.

Barium meals disclosed segmentation in the small intestine in most cases. These signs could not be correlated with the severity or otherwise of the steatorrhoea. Non-flocculating barium suspensions were not used. In most cases the segmentation disappeared after therapy.

Blood glucose was examined at half and one hour after administration of 100 gm. All 15 patients examined showed impaired absorption at both periods (means of 12 mgm. per cent. and 15 mgm. per cent., respectively: normal taken as not less than 25 mgm. per cent.). Study of

glucose absorption in large groups of controls showed that over 20 per cent. of normal students had low figures at half an hour, and 45 per cent. after 1 hour. The author concluded that this test was not highly significant.

Xylose absorption tests showed low excretion in 14 patients 5 hours after taking the sugar, and low 2-hour blood concentration. Figures returned towards normal after therapy. The author noted that most patients complained of exacerbation of their diarrhoea and other abdominal signs after taking xylose and suggest that this might be of diagnostic interest.

Vitamin A absorption was poor in all cases. Fasting values were low, as they were also in regard to serum carotenoids. Serum levels at 5 and 7 hours after administration of the vitamin were low. Absorption improved after therapy.

Absorption of fat was measured in terms of serum opacity. Chylomicron determinations were unsuccessful. After an oral dose of 30 gm. of butter fat absorption was low but improved progressively over the 5-hour period. During treatment absorption returned towards normal.

Fat balance was estimated on an intake of 70 gm. daily for 10 to 12 days. Normal faecal loss of fat was taken as not greater than 5.5 gm.; of 13 patients, 5 excreted 5.5 gm. or less and only 3 excreted more than 8 gm. The degree of steatorrhoea was therefore low.

Absorption of iron was poor in the patients.

Bacteriological examination of the jejunal juice revealed no differences from normal.

Some patients were given both folic acid and vitamin B12. Measurement of the serum concentration of the latter in 8 patients before treatment indicated there was no deficiency. The vitamin was subsequently not given, patients receiving only folic acid 15 mgm. orally each day for 1½ months or longer, up to 10. No specific diet was given. Patients remained on the full army diet. The majority of patients responded to therapy.

Appetite improved early but it was usually some weeks before the diarrhoea disappeared and the stool appearance improved.

The author concludes that a malabsorption syndrome without anaemia exists in Puerto Rico and that there is no clear evidence of its aetiology. In these cases dietary and bacterial factors were not evident.

*B. G. Macgraith*

GIRDWOOD, R. H. **Absorption in Sprue of Vitamins of the B Complex.**  
*Lancet.* 1956, Oct. 6, 700-701.

The author investigated 10 cases of steatorrhoea. Clinical details are not given but 3 were considered to be "tropical sprue", 5 idiopathic steatorrhoea, one had diabetes with steatorrhoea and one had tabes mesenterica.



Patients were given subcutaneous injections of vitamins as follows: pteroylglutamic acid 5 mgm.; riboflavine 10 mgm.; aneurine 25 mgm.; pyridoxine 50 mgm. The urine was collected for 24 hours and specimens preserved under toluene and also glacial acetic acid where measurements of aneurine and riboflavine were to be made.

Thereafter the same dose of vitamin from the same batch was given orally and the urine collected in the same way.

Comparison of output after injected and after oral dosage showed malabsorption of folic acid in all 10 cases, but no similar effect in riboflavine, aneurine or pyridoxine, when compared with similar records obtained from 16 controls similarly dosed.

B. G. Maegraith

FRENCH, J. M., GADDIE, R. & SMITH, NADYA M. **Tropical Sprue. A Study of Seven Cases and their Response to combined Chemotherapy.**

*Quart. J. Med.* (n.s.) 1956, July, v. 25, No. 99, 333-51, 6 figs. [31 refs.]

Seven young servicemen suffering from "moderately severe uncomplicated sprue" were selected for oral chemotherapy. They were flown direct from the tropics and arrived in hospital 10 to 21 days after leaving Hong Kong or Malaya. Symptoms had developed from 3 to 18 months previously.

The history was typical of sprue. No gross physical abnormalities were found apart from glossitis and stomatitis. Only one patient was passing formed stools. Over a preliminary observation period of several weeks special investigations were carried out, including fat balance on a controlled fat intake (all showed absorption below 85 per cent.; normal 90 per cent.); chylomicrographs (after 24 gm. butter: all subnormal); oral glucose tolerance tests (all delayed or subnormal); pancreatic enzyme activity (amylase, lipase, trypsin: normal); follow-through X-rays with ordinary barium suspension (all showed flocculation) and "raybar" (all showed dilated pattern without flocculation); blood examination (diminished erythrocyte counts and a "tendency to macrocytosis"); microscopic and bacteriological examination of the stool (no evidence of dysenteric or salmonella organisms or of *E. histolytica*).

Chemotherapy was given as follows. The following drugs were used, given in 4 divided doses in the 24 hours: succinylsulphathiazole (Sulphasuxidine), 10 gm. daily; phthalylsulphathiazole (Sulphthalidine) 6 gm. daily; chloramphenicol (Chloromycetin), 1 or 2 gm. daily; chlortetracycline (aureomycin) 1 or 2 gm. daily; streptomycin, 1 gm. daily; crystalline penicillin, 2 mega units daily. No other drugs were used, except vitamin B12 in Case 2.

No marked improvement was noted over the observation period, but considerable improvement followed rapidly upon chemotherapy and was subsequently maintained. Progress was determined by general examination, blood examination and by daily faecal fat determinations (on a

controlled fat intake), by repeated weighing, by chylomicrographs, glucose tolerance tests and a further X-ray examination of the small intestine after the return of fat-absorption to normal.

During the control period fat absorption fluctuated, with the general level remaining low; no spontaneous improvement was maintained for more than a few days. After the chemotherapy there was a rapid return to normal in all cases.

Body weight, which was constant in the control period, increased rapidly from the beginning of therapy. Glucose tolerance curves improved and the X-ray picture showed the normal feathery pattern in the jejunum, with some flocculation in the ileum in some cases. The blood picture improved in all cases, although some macrocytosis persisted.

In most cases by the end of chemotherapy the faeces had changed from pale to dark and had become formed. Aureomycin had characteristic effects on the stool during treatment.

The initial treatment was carried out in 1951 to 1953. Follow up questionnaires in 1954 and 1955 showed normal haemoglobin concentrations and red cell counts, and no relapses.

There is an excellent discussion in which the authors put forward their views on the mechanism of malabsorption in sprue and the influence of chemotherapy.

[It is impossible to do justice to this work in a short review. No-one interested in sprue and allied conditions should fail to read this most interesting and important article. It is unfortunate, however, that details of diet are not given, either during the observation period or later, when the appetite was improving.]

B. G. Maegraith

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## HAEMATOLOGY

ADAMS, E. B. **Treatment of Megaloblastic Anaemia of Pregnancy and the Puerperium with Vitamin B<sub>12</sub>.** *Brit. Med. J.* 1956, Aug. 18, 398-400. [24 refs.]

Of 34 cases of megaloblastic anaemia in Durban associated with pregnancy or puerperium 10 were chosen for trial. Details are included in the Table.

In all, the bone-marrow was megaloblastic, *i.e.*, contained true megaloblasts (6 of this series) or intermediate cells as well as giant metamyelocytes (4 of this series). Family incomes were low. Carbohydrate intake was high in all, protein low in 7 and adequate in one.

All patients were observed for a few days before treatment with vitamin B<sub>12</sub>. One patient was treated with penicillin and streptomycin 7 days

before B12 was given. B12 was given intramuscularly in doses of 100  $\mu$ gm. for 1 up to 14 days.

Seven patients responded to the vitamin; 3 of these received only one dose, the other 4, 1,000  $\mu$ gm. or more. In 4, in which the bone-marrow was examined during the trial, erythropoiesis was normoblastic.

Case No.	Age	Previous Pregnancies	Haemoglobin (gm./100 ml.)	MCV (Cubic $\mu$ )	MCHC (%)	Reticulocytes (%)	Serum Proteins (gm./100 ml.)		Serum Bilirubin (mgm./100 ml.)	Free Acid
							Total	Albumin		
1	29	5	3.9	89	25	0.5	8.1	4.8	0.8	+
2	26	1	3.2	98	36	1.2	7.0	4.0	0.4	+
3	20	0	3.1	96	36	1.6	7.3	3.4	0.6	+
4	28	10	5.6	106	27	4.4	7.9	3.4	0.2	+
5	35	5	3.2	125	32	3.3	6.0	2.6	0.9	+
6	26	0	4.4	144	35	5.4	6.6	3.5	0.8	—
7	43	7	6.9	93	33	2.3	6.0	3.2	0.8	+
8	33	8	4.4	97	35	1.3	5.8	2.5	2.9	—
9	20	0	6.5	111	34	1.4	4.7	2.3	0.7	+
10	30	9	4.4	135	33	5.9	5.6	2.5	0.4	+

Vitamin B12 was ineffective in two patients (cases 8 and 10) and the result was inconclusive in one (case 9). These 3 patients were all treated antepartum (4–10 weeks).

The author concludes that, in view of the differences in bone-marrow pattern and in response to treatment, "it seems likely there are several varieties of megaloblastic anaemia associated with pregnancy".

B. G. Macgraith

JONXIS, J. H. P. Het voorkomen van abnormale hemoglobinen bij de mens. [**The Occurrence of Abnormal Haemoglobins in Man**] *Nederl. Tijdschr. v. Geneesk.* 1956, Nov. 10, v. 100 (iv), No. 45, 3259–71, 7 figs.

This is a survey of the knowledge up to date on haemoglobin variants and thalassaemia. It is written in Dutch and is the first authoritative introduction in this rapidly growing field for the Dutch-reading public in Holland and overseas. Readers of all tongues will find the tables and reproductions useful, and in particular they will find it worth while to examine the paper for the complete analysis of protein-hydrolysates for amino-acids which it gives for haemoglobins A, S, C and E.

[Sickle-cell haemoglobin was called at one time haemoglobin B. Since 1953 by universal agreement this has been altered to haemoglobin S. The author of this paper must be the only distinguished worker in this field who still uses the old nomenclature. Although the theory of the



sickling gene arising in the Middle East and spreading from there towards Africa and towards India is given in the text, a pictorial description of the spreading of abnormal haemoglobins and of thalassaemia over the earth still shows an arrow bridging the Indian Ocean as if the gene had sailed across from India to Africa.]

H. Lehmann

LAZAR, H. P. **Thalassemia in a Hawaiian Family of Filipino Extraction.**

*Blood*. 1956, Nov., v. 11, No. 11, 1019-23, 1 fig. [25 refs.]

"Hematologic data are presented on thalassemia in a Hawaiian family of Filipino extraction, and support is given the recent trend to broaden the ethnic concept of thalassemia. Because of recent reappraisals of older reported cases by other investigators in the light of newer electrophoretic technics, the need for continued re-evaluation is suggested."

I. LEHMANN, H. & RAPER, A. B. **Maintenance of High Sickling Rate in an African Community.** *Brit. Med. J.* 1956, Aug. 11, 333-6.

[18 refs.]

II. WILSON, W. A. **Sickling in African Community.** [Correspondence.]

*Ibid.*, Aug. 25, 481.

I. The authors addressed themselves to the problem of whether mortality due to malaria in children not possessing the sickling trait is greater than that due to the same cause in those who possess the trait, and whether this factor and the survival of sickling homozygotes contribute to the maintenance of high frequency of the gene in adult life in some communities. To obtain more information on these subjects the Baamba Tribe in Uganda was examined for they exhibit the highest sickling rate in that country.

Blood from 623 persons was examined for sickling and for the presence of malaria parasites, and in all cases in which the sickling test was positive and in some 50 per cent. of those in which it was negative the blood was also examined by paper electrophoresis. In the adult population a sickling rate of 37.0 per cent. was found. Of 227 persons whose blood sickled, 223 possessed both haemoglobin A and S. Two children were found who were homozygous for the sickling gene, and in 2 babies foetal haemoglobin only could be detected, it being impossible in these 2 instances to determine whether they were homozygotes or heterozygotes. Among the 478 adults in the sample no sickling homozygotes were found; calculations show that at least 5 should have been present, and the survival of sickle-cell homozygotes therefore plays no significant part in the maintenance of the high sickling rate in the Baamba.

In a closely reasoned statement the authors consider the problem of balanced polymorphism in the community. As a working hypothesis they

suppose that maintenance of the high sickling rate was brought about by deaths from *P. falciparum* malaria among normal homozygotes in childhood or an insignificant number of deaths among heterozygotes. In testing this hypothesis they analyse such vital statistics as are available. These suggest that 65 per cent. of children born in the community die before the age of puberty, and that if malaria causes deaths concurrently with other diseases an excessively high malarial death rate would not be required in order to maintain the sickling rate of 37 per cent. Thus, if the population is considered before non-malarial causes of death have operated, a death rate from malaria of 24.2 per cent. among normal heterozygotes or of 15.7 per cent. among the whole population (normal heterozygotes plus sicklers) would, they consider, be sufficient to maintain the observed sickling rate. If the whole community is considered, after other causes of death have operated, a malarial death rate of only 6.9 per cent. would, it is stated, be sufficient. If malaria causes deaths concurrently with other diseases the figure would, it is argued, lie between 15.7 and 6.9 per cent. Malarial statistics for the area are not available, but comparison with similar regions [this *Bulletin*, 1951, v. 48, 1059; 1955, v. 52, 115] indicates that a malarial death rate within this range is probable and the hypothesis concerning malaria as a cause of the high sickling rates thereby, they consider, receives support.

This work has many important implications and one deduced by the authors is the possibility that identical sickling rates associated with similar malarial rates, may be explained by differing death rates from non-malarial causes operating before the age at which malaria mainly causes death. Thus "no simple measure of malaria morbidity or mortality, even if it were the malarial mortality in normal homozygotes that could be measured, could enable one to predict accurately the sickling rate that might be maintained. The situation cannot be defined without reference to the whole infant mortality, and its relation in time to the malarial deaths".

II. In this letter the supposition is contested that malarial mortality acting differentially upon normal homozygotes can be reduced by the simple expedient of being deferred until other diseases have reduced the child population. The point is illustrated by submitting to mathematical analysis figures given in the paper by Drs. Lehmann and Raper. It is deduced that the proportional reduction due to malaria is independent of other mortality operating and will be the same whether acting alone or concurrently.

A. W. Woodruff

MOSES, W. S., MATOTH, Y. & LEVIN, S. [**Sickle-Cell Disease in Israel. Report of 5 Cases in an Arab Family**] *Harefuah*. Jerusalem. 1956, Dec. 2, v. 51, No. 11 [in Hebrew 255-61, 7 figs. & 2 charts. (29 refs.) English summary 261-2].

TANAKA, K. R., CLIFFORD, G. O. & AXELROD, A. R. **Sickle Cell Anemia (Homozygous S) with Aseptic Necrosis of Femoral Head.** *Blood*. 1956, Nov., v. 11, No. 11, 998-1008, 8 figs. [22 refs.]

"1. Six patients with sickle cell anemia who exhibit aseptic necrosis of the femoral head are presented.

"2. All patients were proven homozygous S by paper electrophoresis.

"3. In our material, aseptic necrosis of the femoral capital epiphysis in patients with sickle cell anemia is not an uncommon finding, 12% of 51 cases demonstrating this lesion.

"4. The incidence of this lesion may be even greater than we report. inasmuch as some of our patients were asymptomatic, although typical roentgenographic changes of aseptic necrosis of the femoral head were present."

JENKINS, M. E., SCOTT, R. B. & FERGUSON, Angella D. **Studies in Sickle Cell Anemia. VII. Blood Volume Relationships and the Use of a Plasma Extender in Sickle Cell Disease in Childhood: a Preliminary Report.** *Pediatrics*. Springfield, Ill. 1956, Aug., v. 18, No. 2, 239-48, 4 figs. [28 refs.]

The authors suggest that the failure in sickle-cell anaemia patients to obtain striking changes in haemoglobin concentration after transfusion of blood may result from increase in blood volume associated with the increase in total circulating haemoglobin mass, the haemoglobin concentration thus remaining relatively unchanged. Blood transfusion may therefore function more than simply in terms of replacement of erythrocytes.

Since plasma infusions have been found to be successful in sickle-cell crises, the authors decided to try the effects of infusion of 6 per cent. dextran in 5 per cent. fructose. Infusions were performed during crises in 16 Negro children between the ages of 2 and 14 years. Total erythrocyte and plasma volumes (dye injection technique with the dye T 1824) were measured before each 24 hours after infusion. Whole blood was given to 8 children, dextran to 8, 3 cases of sickle anaemia were watched as controls and erythrocyte and plasma volumes were measured in 16 normal children.

The plasma volumes of patients were consistently higher than in normal controls.

Twenty-four hours after infusion of whole blood, the total blood volume was raised in sickle anaemia patients and there was an increase in circulating haemoglobin mass greater than could be accounted for by the introduced erythrocytes.

Increase of blood volume in 24 hours occurred in 3 of 9 patients after dextran administration; increase in total mass of haemoglobin occurred



in 6; 6 showed definite clinical improvement (3 without increase in blood volume).

Dextran clearly has possibilities in the treatment in the crises of sickle-cell anaemia. The authors suggest that the high circulating haemoglobin mass obtained in both whole blood and dextran infusions might be explained by mobilization of erythrocytes "trapped or stagnated in organ depots and/or small peripheral vessels".

[In the text the number of patients given whole blood or dextran is given as 8. In the tables 9 cases are included in each group.]

B. G. Macgrath

VANDEPITTE, J. Enquête sur les hémoglobines anormales au Kasai (Congo belge). Premier porteur d'hémoglobine D en Afrique Noire. [**Survey of Abnormal Haemoglobins at Kasai, Belgian Congo. First Carrier of Haemoglobin D in an Indigenous African**] *Acad. Roy. Sci. Coloniales Bull. des Séances*. Brussels. (n.s.) 1956, v. 2, No. 4, 697-716, 4 figs. (3 on 3 pls.). [29 refs.]

The following is a translation of the author's summary:—

An outline is given of the different types of normal and abnormal haemoglobins, together with their genetic, clinical and anthropological features.

The diagnosis of the haemoglobin character is based on three fundamental techniques: microelectrophoresis on paper, determination of alkali-resistant haemoglobin and study of the solubility of reduced haemoglobin.

A simplified method of electrophoresis on paper is described in detail.

During 3 surveys, involving 675 Africans of the Belgian Congo, the author found, besides haemoglobin S, one case of haemoglobin C sickle-cell disease and a case of the haemoglobin D trait.

H. J. O'D. Burke-Gaffney

SCHNEIDER, Rose G. & GENEREUX, B. D. **A Second Instance of Haemoglobin G—in an American Negro Family.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Nov., v. 50, No. 6, 614-15.

Haemoglobin G has so far been found in only one family in the Gold Coast. Although many thousands of West Africans have since been examined for abnormal haemoglobins no further instance of haemoglobin G has been recorded. This was somewhat surprising because the one family with haemoglobin G had a homozygote among them, which should be an indication that the haemoglobin cannot be exceedingly rare.

Unless paper electrophoresis at pH 8.6 is carried out most carefully G will be found to resemble S or D, and the present authors rightly

emphasize the important differences between G and S/D seen on open boundary electrophoresis. EDINGTON *et al.* (*Nature*, 1955, v. 175, 850) found that at pH 6.5 on open boundary electrophoresis G does not separate from added S, but separates well from A; at pH 8.6 on open boundary electrophoresis it separates well from S but not from A. [One may well ask whether some of the instances of D reported in American Negroes were not in fact instances of G. One feels that a finding of D should not be claimed unless careful comparison with G has excluded the alternative diagnosis.]

Here is now a second observation of haemoglobin G in a 17-year-old American Negro and in his mother. Comparisons with G from the original family, and determination of the specific properties on open boundary electrophoresis established the diagnosis. As in the case of the original propositus so in the two American Negroes with haemoglobin G, the proportion of the abnormal haemoglobin was just over 50 per cent. Except J where the abnormal haemoglobin formed two-thirds of the haemoglobin mixture, all other variants have so far been seen to contribute rather less than half to the total haemoglobin in heterozygotes for haemoglobin A.

H. Lehmann

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## VENOMS AND ANTIVENENES

MOHAMED, A. H. & ZAKY, O. **Biochemical and Physiological Studies of the Purified Toxin of *Walterinnesia aegyptea* 'the Egyptian Black Snake'.** *J. Exper. Biol.* 1956, Sept., v. 33, No. 3, 502-7, 3 figs. [14 refs.]

Venom of the black snake was precipitated in acetone and also in picric acid, followed by acetone. A solution in distilled water of the crystalline toxin produced by these manoeuvres was tested against the isolated guineapig uterus, which contracted, and against isolated rabbit jejunum, which relaxed and became more active. Toxin added to the perfused frog heart and the perfused rabbit heart caused decrease in rate and temporary improvement in contraction. There were sometimes extrasystoles, and partial and finally complete heart block supervened. Salivation in rats and dogs was increased by injection of toxin; the effect was abolished by atropine but not by ergotoxin. These effects in all cases were reversed by repeated washing.

The authors conclude that the toxin has an excitatory parasympathetic effect on the uterus and intestine. It causes excessive salivation and partial or complete heart block, abolished by atropine. MLD for rats was 0.035 to 0.05 mgm. toxin/100 gm. body weight. Atropine prolonged but did not save life.

B. G. Macgraith

SOUTHCOTT, R. V. **Studies on Australian Cubomedusae, including a New Genus and Species apparently harmful to Man.** Reprinted from *Australian J. Marine & Freshwater Res.* 1956, v. 7, No. 2, 254-80, 23 text figs. & 13 figs. on 3 pls. [43 refs.]

The author summarizes available information regarding the clinical effects of stinging by jelly fish and allied creatures in Australian waters. There appear to be 2 principal groups of syndromes: *viz.*, Type A, in which stinging results in severe, even fatal, general effects without wealing and Type B, in which wealing is produced but general effects are not severe.

Type A stings constitute a homogeneous group, caused by an as yet unidentified agent. Type B stings are heterogeneous with more than one agent responsible (including the well-known *Physalia* spp.).

The author examined specimens of Cubomedusae from Cardwell, Northern Queensland, where a recent fatality was reported, tentacles being present in the victim's hair. He claims they represent a single species of a new genus which he called *Chironex fleckeri* (after Dr. FLECKER who described the case at Cardwell and obtained the relevant specimens).

The proposal of a new genus and new species is backed by a mass of clearly stated evidence which will require the attention of systematists.

[This paper contains a most interesting summary of clinical material.]

See also this *Bulletin*, 1952, v. 49, 643, 1153.

B. G. Macgregair

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## TOXOPLASMOSIS

VAN THIEL, P. H. **The Taxonomic Status of *Toxoplasma gondii*.** *Antonie van Leeuwenhoek: J. Microbiol. & Serol.* 1956, v. 22, No. 3, 248-56, 4 figs. [29 refs.]

Electron microscope studies of whole mounts and sections of *Toxoplasma gondii* revealed the existence of a large conoid measuring  $1.3\ \mu$  at the anterior end of the parasite. This organelle can become invaginated into a collar; it is probable that its function is to enable the parasite to bore into the host cell. The conoid is much larger than the structure described by GUSTAFSON *et al.* [see this *Bulletin*, 1955, v. 52, 828] and is probably not the same. It is accompanied, however, by 14 very fine fibrils which extend like a fan backwards from the point; these are probably the "toxonomes" of other authors.

The taxonomic relationships of *Toxoplasma* are reviewed, and it is suggested that there is a striking similarity between the morphology of this organism and that of gregarines; the epimerite of *Lankesteria culicis* resembles the conoid of *Toxoplasma*. The former spends part of its life



in an arthropod and part free-living: if one cycle were to be abolished, an intracellular existence alone would remain with a loss of certain features in the life cycle, and this is perhaps what has happened in *Toxoplasma*.

P. C. C. Garnham

VAN THIEL, P. H. **The Persistence of *Toxoplasma* Strains in Albino Rats.**

*Antonie van Leeuwenhoek: J. Microbiol. & Serol.* 1956, v. 22, No. 3, 243-7.

Four Netherlands strains of *Toxoplasma gondii* were tested for the length of their survival in young white rats. The rats were infected with suspensions of mice brains containing the organisms; they were inoculated either intraperitoneally or intracerebrally, and attempts were made to detect the presence of *Toxoplasma* by emulsifying a portion of brain and subinoculating suspensions into mice, whose brains were again tested by the same procedure. After intraperitoneal inoculation there was no persistence of the infection; after intracerebral inoculation of one strain (Colijn) organisms were detected up to 12 months, while the other 3 strains persisted for only a single month. Only 2 rats in the whole series actually died of the acute disease 4 days after intracerebral inoculation. [See also this *Bulletin*, 1950, v. 47, 1229, where JACOBS and JONES demonstrated the persistence of the RH strain in rats after intraperitoneal inoculation, and *ibid.*, 1956, v. 53, 1168, where LAINSON showed a similar degree of survival both in rats and rabbits.]

P. C. C. Garnham

VAN SOESTBERGEN, Adrianus Antonius. Over de reactie van Sabin en Feldman. Een analyse van de resultaten verkregen bij titratie van *Toxoplasma*—antilichaam in mensenserum. [**The Sabin-Feldman Reaction**] [Thesis]. 194 pp., illustrated. English summary. 1956. Leiden: Rapenburg 33, Holland.

In this work, which is a thesis submitted for a doctorate in the University of Leiden, the author has made an exhaustive analysis of the factors affecting the results of the Sabin-Feldman dye test for the diagnosis of toxoplasmosis. The effect of various concentrations of activator, sodium chloride and non-electrolytes (glucose and sucrose), and of time and temperature of incubation upon the percentage of unstained parasites was investigated. The results of the titrations were analysed statistically on the basis of a normal distribution of tolerance of parasites to antibody, and a detailed scheme for the computation of a probit regression line to fit the experimental data is presented. The work contains more information of value than can be adequately summarized, and those who are concerned with the conduct of the dye test will find it useful to consult the original.

D. J. Bauer

LAARMAN, J. J. **Transmission of Experimental Toxoplasmosis by *Stomoxys calcitrans*.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, Sept., v. 8, No. 3, 293-8. [15 refs.]

A colony of *Stomoxys calcitrans* was reared at a temperature of 25°C. and a humidity of 75 per cent. The adults were allowed to feed on guineapigs or mice infected with *Toxoplasma gondii* and showing the organisms in the blood. In the first series of experiments, the time of survival of the infection in the fly was ascertained by grinding the washed flies after various intervals in Tyrode solution plus antibiotics and inoculating the suspension subcutaneously into mice. The organs of the dead mice were examined, or surviving mice were killed and brain smears were examined for pseudocysts and suspensions of the organ were inoculated into fresh mice. Virulent *Toxoplasma* survived for 22 hours after the infectious meal.

In the second series of experiments, *Stomoxys* which had fed on infected animals were allowed to feed on clean mice or guineapigs either (a) by interrupted feeding or (b) after an interval of up to 9 days. No infection took place after interrupted feeding, and only a single doubtful transmission occurred in the following circumstances. A guineapig was bitten by 13 *Stomoxys* which had fed 24 hours earlier on an infected animal; its brain was later removed and inoculated into mice which did not die but developed a positive dye test (1 in 4,096). It is thought that infection took place because a few parasites remained trapped in the mouth parts of the flies, which contaminated the subsequent feed 24 hours later. There was no evidence of cyclical development in these insects.

P. C. C. Garnham

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## DERMATOLOGY AND FUNGUS DISEASES

SHIELDS, T. L. & WALSH, E. N. "**Kissing Bug**" Bite. *Arch. Dermat.* 1956, July, v. 74, No. 1, 14-21, 9 figs. [16 refs.]

In the last 2 years the authors, from Texas, have seen 45 patients with lesions caused by the bite of the "kissing bug", *Triatoma sanguisuga*. None of the patients were aware of a bite or of the bug, but were all able to find the bugs in their beds when advised to look for them. The biology and distribution of the bugs is described at length and illustrated by photographs and a map, and there are also 6 photographs of lesions.

*T. sanguisuga* is a dark-brown to black insect 18 to 24 mm. in length, with orange markings in the periphery of the posterior two-thirds of the body. The bugs are active and can hide easily in bed-clothes. Their usual habitat is the nest of the wood-rat, opossum and armadillo and they tend to multiply about farm buildings where warm-blooded animals are available as a source of food. The species has a life cycle of about one

year and the females hatch in 15 to 20 days. The bite is painless and does not seem to take place through clothing. Biting takes place at night and one bug usually inflicts multiple bites. The most frequent sites of attack in the authors' series were the hands, arms, feet, head and trunk. The normal interval between feedings is about 3 weeks. Bites were seen most often between April and November, but in warm climates the bugs are active throughout the year.

The patients affected came from all areas and economic levels and usually no obvious natural source of the bugs was found.

Reactions to the bite are apparently sensitization phenomena and their severity depends on the sensitivity of the host and probably on the amount of antigen introduced. This is illustrated by an account of the experiences of each of the authors themselves in experimental bites.

Four types of reactions were recognized: (1) Papular lesions rather more severe than ordinary insect bites. When these are grouped they may be mistaken for atypical herpes zoster. (2) Small vesicles grouped over an area 2 to 3 cm. in diameter, with moderate swelling and little redness. (3) Giant urticarial weals, mostly erythematous, 10 to 16 cm. across, with extensive brawny oedema. (4) Haemorrhagic nodular-to-bullous lesions on the hands and feet. These are the most characteristic severe reactions and can be recognized as "kissing-bug" bites. They are multiple and suggest erythema multiforme, but are usually unilateral.

The last two types may be accompanied by lymphangitis and lymphadenitis. As these complications were commonly unaffected by antibiotics, they do not seem to be due to secondary infection.

Treatment is symptomatic and prevention lies in seeking and destroying the bug, which requires a thorough search. Several patients found the common insecticides ineffective.

The authors discuss the relationship of the bug to Chagas's disease. Although *T. sanguisuga* has the widest distribution of all the triatomids in the United States, it is suggested that one reason why Chagas's disease had not hitherto appeared there may be because *T. sanguisuga* does not defaecate for 20 to 30 minutes after feeding. They predict that the disease will sooner or later occur in the United States and, indeed, refer in a footnote to the first such instance, reported since their article was written [this *Bulletin*, 1956, v. 53, 421]. H. J. O'D. Burke-Gaffney

PARDO-CASTELLO, V. **Dermatology in a Tropical Rural Zone. Reference to Occupational Dermatoses.** *Arch. Dermat.* 1956, Aug., v. 74, No. 2, 115-27, 6 figs. [18 refs.]

Tropical disease varies according to the part of the world in which it is located. Even in a limited tropical zone such as the Caribbean Islands factors such as race, mode of living and eating and hygienic habits influence the disease patterns of the region, and conditions prevalent in rural areas cannot be found in the towns.



The present survey is confined to a study of those whose work was connected with farming and harvesting in the rural zones of Cuba. From the files of the Department of Dermatology of the University Hospital in Habana 1,074 clinical histories were studied, the patients being 884 white and 190 coloured, 857 male and 217 female.

A large number of patients, nearly 24 per cent., suffered from eczematous dermatitis, mostly of contact type. In many cases the dermatosis was due to contact with weeds, other plants or trees, tough shoe leather and chemicals such as fertilizers and insecticides. Only 14 patients claimed that contact with sugar caused their condition, but "berloque" dermatitis from contact with the oil of citrus fruits was common among agricultural workers exposed to sunlight.

Malignant tumours were common, accounting for 10.24 per cent. of the total, the numbers being basal-cell epitheliomas 53, spindle-cell epitheliomas 45, 1 melanoma, 1 metastatic carcinoma, 3 sarcoma, 3 granuloma fungoides, 1 lymphoblastoma and 3 unspecified. The majority of basal and spindle cell epitheliomas were on the face and the extremities. Epithelioma of the penis was common, being associated with phimosis and chronic inflammation.

Superficial mycoses accounted for 8.56 per cent. of the total, the fungi recovered being *Trichophyton mentagrophytes*, *T. rubrum*, and *T. floccosum*. Generalized tinea was seen in 3 adults caused by *T. tonsurans* in one case and *T. rubrum* in the other two. Deep mycoses occurred in 3.53 per cent. of the total: the conditions found were chromomycosis, mycetoma and sporotrichosis.

Psoriasis was quite common and affected 6.33 per cent. of the total, 61 patients being white and 7 Negroes. Among the animal parasites *Tunga penetrans* was common and one patient was seen with no less than 150 lesions.

There were 25 cases of perforating ulcer of the foot. Of these 4 were due to leprosy, 2 to tabes, 4 associated with spina bifida, 10 to trauma and polyneuritis and 1 to diabetes.

Folliculitis decalvans of the extremities was found among sugar cane harvesters and affected 34 patients. It usually started on the legs and forearms at the same time and was believed to be due to the stiff needles on the bark of the sugar cane. There is a lengthy discussion on occupational dermatoses in agricultural workers, and reference to the skin manifestations of some tropical diseases.

H. T. H. Wilson

SCHMIDT, Frederick Rehm [A.B., M.D.] *et al.* **Clinical Selections in Dermatology and Mycology.** pp. xx + 505. 1956. Springfield: Charles C. Thomas, 301-327, East Lawrence Avenue, Ill., U.S.A. Oxford: Blackwell Scientific Publications, 24-25, Broad Street. [80s.]

The clinical selections presented in this attractive book represent the more important recent developments in dermatology, particularly in relation to the clinical features, pathology, diagnosis and treatment of skin diseases. The circumstance that 20 of the 35 contributors to the work are residents in countries of Latin America, ensures that the interests of the tropical physician are adequately served. In this connexion, the chapters dealing with the cutaneous manifestations of yaws, syphilis, pinta, leprosy, American leishmaniasis, amoebiasis, Chagas's disease, toxoplasmosis and bartonellosis, as well as those on the skin lesions caused by the attacks of arthropods and helminths, and the questions of hot climate miliaria and the relation of sunlight to skin diseases in the tropics, are of particular importance.

However, the scope of the book embraces a much wider field than that of the tropical dermatoses, and, among some of the other articles deserving special mention are those on the collagen diseases, psychosomatic dermatoses, neurodermatitis, and vasospasm in relation to skin diseases. The descriptions of fungus diseases affecting the skin occupy 75 pages divided into 11 chapters, and constitute a particularly valuable section of the book. The entire range of the superficial and the deep mycoses has been included, and the concise but clear and adequate clinical descriptions and the well reasoned discussions on diagnosis and treatment of these diseases will be found most helpful.

The book is commended to all physicians and especially to those interested in tropical diseases and in medical mycology. *J. T. Duncan*

POMPEO, I. & PARONI, F. Piede di Madura (studio radiologico delle alterazioni scheletriche e vasali). [**Radiological Study of the Bony and Vascular Changes in Madura Foot**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1956, Oct., v. 37, No. 10, 543-54, 4 figs. [29 refs.]

The English summary appended to the paper is as follows:—

“Following a short introduction of general character, the authors describe the main and more frequent bony and vasal alterations which are seen in the anatomopathological and radiological examinations in the foot mycetoma. Besides a radiographic picture which is most frequent in Madura foot (areolar and cribrate aspect of the bone), there are rarer and atypical radiographic pictures in which the lesions may be characterised either by thickness or by rarefaction. Both the arteriographic and the phlebographic examinations have mainly revealed 3 elements: absence of alterations in the large vessel walls; presence of tortuosity only in the course of some large vessel, due to the surrounding mycelian small masses; diffuse opacity in the foot tissues seen at the arteriographic examination and due to the circulatory stasis induced by peri and endo-arteritis obliterans of the last vasal branches.”

SLADE, P. R., HASEEB, M. A. & MORGAN, H. V. **Oxytetracycline in the Treatment of Maduromycosis.** *J. Trop. Med. & Hyg.* 1956, Nov., v. 59, No. 11, 262-6. [34 refs.]

The authors use the term "maduromycosis" in a wide sense to include both the maduromycotic and the actinomycotic forms of mycetoma. Six patients suffering from the "black grain" type (probably due to *Madurella mycetomi*), and 5 from the "yellow grain" type of the disease (probably *Nocardia somaliensis*) were treated with oxytetracycline (Terramycin) at the daily dosage of 2 gm., to the total of 50 gm. for the entire course of treatment. In 4 patients of the black grain group and 4 of the yellow grain group this treatment resulted in diminution of the swelling, cessation of the discharge and closing of the sinuses, but the effect appears to have been merely temporary, and in those patients followed up for 6 months or longer after cessation of treatment, recurrence of the swelling and discharge was the rule. In one patient, in whom the disease, of the black grain type, was confined to a finger, cure was effected by surgical excision of the lesion after the antibiotic treatment had failed. The 3 remaining patients showed no evident response to oxytetracycline.

The authors consider that the temporary improvement reported was attributable to the action of the antibiotic on the primary mycotic disease and not to the relief of any secondary bacterial infection. In view of this, further therapeutic trials with oxytetracycline should be made in this disease.

J. T. Duncan

LONDON, I. D. **Hydroxystilbamidine Treatment of North American Blastomycosis.** *Southern Med. J.* 1956, Oct., v. 49, No. 10, 1098-1103, 4 figs. [17 refs.]

A brief review of published reports on the successful treatment of North American blastomycosis with stilbamidine and with 2-hydroxystilbamidine, is followed by an account of 4 additional cases of the disease treated with the latter drug. Two cases were of the purely cutaneous type; in one of these, of 4 months' duration, there were extensive lesions on both legs which had not responded to specific *Blastomyces* vaccine therapy, potassium iodide and a course of 8 superficial Roentgen irradiations. The second patient had a single lesion on the left leg, of 15 months' duration.

Both patients responded well to intravenous administration of 2-hydroxystilbamidine [see SUTLIFF *et al.*, this *Bulletin*, 1954, v. 51, 1295]. The first patient received a total dosage of 5.025 gm. in 2 courses and the second patient 6.06 gm. of the drug, followed, after some months, by an additional course, as a precautionary measure. These 2 patients were under observation for 10 months and 6 months, respectively, after treatment, and both appeared to be completely cured. Signs of healing were noticed within 2 weeks of the beginning of treatment.



The remaining two cases were of the pulmonary type. The third patient, a 19-year-old man, had a nummular lesion in the right upper lobe, suspected to be tuberculous. Lobectomy was performed and the examination of the biopsy specimen led to the diagnosis of blastomycosis. Treatment with 3-hydroxystilbamidine for 50 days, with the total dosage of 11.25 gm., brought about symptomatic recovery, which was confirmed by examination a year later. The fourth patient, a man aged 45, suffered from acute blastomycotic pneumonitis of the left lower lobe, with pleural effusion. Administration of 2-hydroxystilbamidine to a total dosage of 9.8 gm. caused symptomatic improvement and progressive resolution of the pulmonary lesion. During the 2 months between the cessation of treatment and the preparation of this report, the improvement continued.

J. T. Duncan

FRIEDMAN, Lorraine, SMITH, C. E., ROESSLER, W. G. & BERMAN, R. J.

**The Virulence and Infectivity of Twenty-Seven Strains of *Coccidioides immitis*.** *Amer. J. Hyg.* 1956, Sept., v. 64, No. 2, 198-210, 5 figs. on 2 pls. [14 refs.]

A comparative study of virulence (in the sense of pathogenicity as distinct from infectivity) was made on 27 strains of *Coccidioides immitis*, from benign and fatal types of coccidioidomycosis in man and from other sources. Suspensions of viable fungal particles, for intraperitoneal injection into mice, were prepared from dried cultures on a glucose agar medium and from the submerged growth of *C. immitis* in a liquid medium. The former suspension consisted mainly of spores but the latter contained many short strings of cells and mycelial fragments.

A uniform infecting dose of approximately 100 viable fungal particles of the individual strain, was injected into a group of mice intraperitoneally, and the resulting mortality rate was measured by the method described by Friedman *et al.* [this *Bulletin*, 1956, v. 53, 805]. These experiments showed that suspensions from the liquid medium were generally less virulent than the corresponding suspensions, richer in spores, from the solid medium, but differences in virulence between strains were shown proportionately with both suspensions. There was no correlation between the virulence of a strain (in the sense of causing death) and its infectivity as demonstrated by production of lesions or the presence of the fungus in the tissues; all virulent strains were infective, but strains of low virulence or almost no virulence might be equally infective.

The 27 strains showed great variation in the degree of virulence ranging from some which caused 100 per cent. mortality in a group of 25 mice within 30 days, to others which caused no deaths in other groups in 90 days.

The racial-host factor and sex play an important role in the host-parasite relationship which determines the severity and the outcome of coccidioidomycosis in man. It is not surprising, therefore, that there is no correlation between the virulence of a strain for mice and the severity of the

disease in man from which it was isolated. Some strains from clinically benign infections in man have been highly virulent for mice and, on the other hand, strains from disseminated, fatal disease in man may sometimes show low virulence for this animal. The age of a strain also bears no particular relationship to its virulence; old laboratory strains from mild infections have sometimes been found more virulent than some recently isolated strains from fatal cases. An old strain from soil, propagated for 15 years in the laboratory, and never passed through animals, was found highly virulent for mice; it was a freely sporing strain.

J. T. Duncan

HENSLER, N. M. & CLEVE, E. A. **Chronic Benign Residuals of Coccidioidomycosis.** *Arch. Intern. Med.* 1956, July, v. 98, No. 1, 61-70, 5 figs. [17 refs.]

The chronic, benign pulmonary lesions, discussed by the authors, are residual lesions, frequently symptomless, persisting for at least 3 months after recovery from primary, acute pulmonary coccidioidomycosis, without dissemination. In the present series of 50 cases, 6 of which are described in some detail, the pulmonary lesions consisted of cavities (21), nodular densities with or without calcification (27), pleural effusion (2), fibrosis (2) and infiltration (2). In 13 of the patients the lesions were discovered in consequence of a history of previous acute pulmonary coccidioidomycosis, in 34 they came to light in the course of routine chest X-ray examinations, and in the remaining 3, complaints of chest pain or haemoptysis drew attention to them.

For the specific diagnosis, all available data must be used, such as a history of previous acute pulmonary coccidioidomycosis, or of possible exposure to infection in an endemic area of the disease, sensitivity to coccidioidin at 1 in 100 or 1 in 10, and serum complement fixation with the coccidioidin antigen, usually in low titre. However, the last test has been known to give negative results in 60 per cent. of patients with coccidioidal pulmonary cavity. The diagnosis is generally based on cultivation of *Coccidioides immitis* from sputum or gastric washings of patients with cavity lesions, and by the methods referred to above and by pulmonary biopsy in those with solid lesions.

In the matter of treatment of these lesions, divergent views have been expressed. FIESE *et al.* [this *Bulletin*, 1956, v. 53, 242] considered the residual lesions, without dissemination, to be an indication of immunological resistance, which accorded with the attitude that unless they were extending or causing symptoms, they might be left to resolve spontaneously. For persistent haemoptysis, blocked cavity, or a subpleural cavity which might rupture and cause a broncho-pleural fistula with its sequelae, however, surgical excision was called for.

The risk of re-infection from residual lesions appears to be very slight; nevertheless, SMITH (*Bull. New York Acad. Med.*, 1953, v. 29, 779)

advocated that cavities which have not healed in 3 to 6 months should be resected, and FORSEE and PERKINS [this *Bulletin*, 1954, v. 51, 1294] regard surgical excision as the treatment of choice for persistent lesions, even when they are symptomless. Pulmonary resection has been performed in many cases for the purpose of diagnosis. From the other standpoint, post-operative extension of the disease is a possibility which must be considered, and surgical excision is contraindicated within a period of 6 months of the acute disease, or in the presence of a high titre of complement-fixing antibody or of disseminated lesions. J. T. Duncan

STRAUB, M. & SCHWARZ, J. **Primary Pulmonary Arrested Lesions of Coccidioidomycosis and Histoplasmosis. A Study of Autopsy Material in Tucson, Arizona.** *Amer. J. Clin. Path.* 1956, Sept., v. 26, No. 9, 998-1009, 12 figs.

The authors report their study of the healed or partly healed pulmonary lesions in persons who had died from causes other than coccidioidomycosis, in an endemic area of that disease in Tucson, Arizona. Lungs removed at necropsy, excluding those with obvious tuberculous lesions, were cut into thin slices and examined by palpation for residual nodules. Nodules of this kind were found in 40 cases and the histological study of these lesions in sections stained by haematoxylin and eosin, elastin-Van-Gieson stain, and Gridley's stain for fungi, revealed evident spherules of *Coccidioides immitis* in 8, and yeasts of *Histoplasma capsulatum* in 19. The relatively high rate of histoplasmic lesions in people in an area where that disease is not endemic was explained by the migration of the majority of the persons concerned from endemic areas of histoplasmosis in other parts of the country.

In 5 of the 8 cases with residual coccidioidal pulmonary lesions there was no evident involvement of the regional lymph nodes, but in 2 of the remaining 3 there was a distinct primary complex. The lesion in sub-clinical coccidioidomycosis is generally confined to the primary pulmonary focus, although in the symptomatic and clinically manifested disease the lymph nodes are usually and sometimes extensively involved. On the other hand, the pulmonary residual lesions of histoplasmosis are rather distinctive [see STRAUB and SCHWARZ, *Bull. Hyg.*, 1955, v. 30, 1066]; they are usually large complexes of chalky consistency with a marked component in an associated lymph node.

In the residual lesions of histoplasmosis, the *Histoplasma* yeasts, measuring from 1 to 5  $\mu$  in diameter, were found in groups or clusters, corresponding to an effete host cell, in the caseous or calcified centre of the lesion, but in the lesions of coccidioidomycosis the spherules of *C. immitis* were usually found close to or within the fibrous capsule of the nodule.

Nodules in which no organism was found were arbitrarily classified as



tuberculous but, admittedly, some of these may have been mycotic lesions from which the fungus had disappeared.

J. T. Duncan

AJELLO, L., REED, R. E., MADDY, K. T., BUDURIN, A. A. & MOORE, Jane C.  
**Ecological and Epizootiological Studies on Canine Coccidioidomycosis.**  
*J. Amer. Vet. Med. Ass.* 1956, Nov. 15, v. 129, No. 10, 485-90,  
9 figs. [22 refs.]

"1) Coccidioidomycosis, involving all of 5 dogs brought into the vicinity of Tucson, Ariz., is described.

"2) A soil sample collected near a rodent burrow in the yard where the dogs exercised yielded *Coccidioides immitis*.

"3) The ecological characteristics of the Tucson area are described and discussed in relation to factors that determine the endemicity of *C. immitis*."

FAVA NETTO, Celeste. Estudos quantitativos sôbre a fixação do complemento na blastomicose Sul-Americana, com antígeno polissacarídico.  
**[Quantitative Studies on the Fixation of Complement in South American Blastomycosis, with Polysaccharide Antigen]** Reprinted from *Arquivos de Cirurg. Clin. e Exper.* S. Paulo. 1955, Sept.-Dec., v. 18, Nos. 5/6, 197-254, 8 graphs. [46 refs.] English summary.

This extensive report, presented as a thesis for the doctorate at the University of São Paulo, is a valuable contribution to the study of the serology of the systemic mycoses, which should be read in the original by those interested in this subject.

In the diagnosis of South American blastomycosis (Lutz's disease) serology has, hitherto, played a very minor part and it cannot replace, for this purpose, the more direct mycological study. Nevertheless, its application in particular circumstances calls for special investigation. Such circumstances are: (1) the diagnosis of Lutz's disease when the lesions are confined to the deep organs and are not accessible to direct mycological examination; (2) as a means of measuring, by titration of antibody, the progress of recovery under various forms of therapy; (3) as a basis of prognosis, on analogy to other systemic mycoses; (4) as a means of detecting possible subclinical infections, in connexion with epidemiological studies; (5) as an additional tool in the search for the disease in the lower animals.

The serological test used by the author in the present studies was the complement-fixation reaction, and, after extensive investigations, the antigen chosen for this work was the polysaccharide material extracted from the yeast form culture of *Paracoccidioides brasiliensis*, by heat in the autoclave. This type of antigen, which was found particularly valuable by NORDEN in his serological study of sporotrichosis [*Bull. Hyg.*, 1953, v. 28,

68]. gave a positive Molisch but a negative biuret reaction. The present author found that its complement-fixing power was greatly increased by removing from it the acetone- and ether-soluble lipid fractions.

Quantitative complement-fixation tests were made on 100 sera from authentic cases of Lutz's disease, and on a variety of control sera, using the techniques of Stein and Van Ngu and of Wadsworth. In the sera from patients with Lutz's disease, excluding those who had recovered under treatment with sulphonamides, 87.3 per cent. gave positive results by the Stein and Van Ngu technique, and 89.5 per cent. by the Wadsworth technique. It was found that more consistent results were obtained with the incubation period, for fixation of the complement, of 18 hours at 0-4°C. than with the shorter period of 4 hours.

Cross complement-fixation reactions occurred with a few sera from other diseases, but appeared to be unrelated to the particular diseases. The great mass of the control sera from healthy or morbid human sources gave negative results with the *Paracoccidioides* antigen.

The complement-fixation test may give a negative result in the earlier stages with the localized disease, and it was not found to be a trustworthy means of detecting deep seated, localized disease. A progressive decline of the CF antibody titre may be good confirmatory evidence of clinical improvement under chemotherapy, but the ultimate disappearance of the antibody is not proof of mycological cure. For the same reason, persistence of a moderate titre of antibody in the face of apparent clinical cure, is an indication to continue treatment.

Further studies, employing other serological methods, are to be undertaken.

J. T. Duncan

FAVA NETTO, Celeste & DEL NEGRO, G. Localização testículo-epididimária da blastomicose Sul-Americana. [**Genital Localization of South American Blastomycosis**] Reprinted from *Rev. Assoc. Med. Brasil*. 1954, June, v. 1, No. 2, 210-13, 4 figs.

The English summary appended to the paper is as follows:—

“The authors, after calling attention to the genital localisation of South-American blastomycosis, give a bibliographic summary of the cases cited in the relative literature; they report a case which was under their observation for thirteen months.

“It is the first reference found in literature to a case of genital localisation of Lutz disease in which the diagnosis was ascertained by testing material obtained from a lesion which had become external. There was no clinical suspicion of the existence of genital blastomycosis diagnosed ‘in vitam’ through direct examination.

“The evolution of the case showed a rapid healing of the genital lesions with sulphadiazine.”

## TROPICAL OPHTHALMOLOGY

ARAKAWA, S., KANEKO, T. & SEKI, T. Untersuchungen über Trachom. IV. Mitteilung: Nachweis von trachomspezifischen Einschlusskörperchen im Hühnerembryo. [**Investigations on Trachoma; IV Demonstration of Specific Inclusion Bodies in Chick Embryos**] *Arch. f. d. gesamte Virusforschung*. 1956, v. 7, No. 1, 79-87, 4 figs. [17 refs.]

The Ohuti strain of trachoma virus was inoculated on to the chorio-allantoic membranes of fertile eggs at the 8th day of incubation; after a further period of 8 days at 35°-36°C. the membranes were harvested for passage and stained preparations of conjunctival epithelium were made. Inclusion bodies appeared in the first passage, and were visible in 80-94 per cent. of epithelium cells in the second passage. In similar experiments with the mouse-adapted S strain of trachoma virus inclusion bodies and initial bodies were seen in preparations made 5 days after infection. A marked reduction in the percentage of cells containing inclusion bodies was observed in neutralization tests in which mixtures of virus and specific antiserum were incubated for 2 hours at 37°C. and overnight at 4°C. before inoculation. [For previous studies, see this *Bulletin*, 1951, v. 48, 499; 1954, v. 51, 640.]  
D. J. Bauer

See also p. 299, SOMERSET & SEN, **Leprosy Lesions of the Fundus Oculi**.

See also p. 322, BOASE, **Coenurus Cyst of the Eye**.

See also p. 328, LAVIER *et al.*, Étude anatomo-pathologique d'un oeil présentant une chorio-rétinite onchocerquienne. [**Pathological Study of a Case of Onchocercal Chorio-Retinitis**]

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MISCELLANEOUS DISEASES

GERMER, W. D. Milzexstirpation bei splenomegaler Leberzirrhose mit Zytopenie. Eine klinisch-pathologische Analyse von 10 Fällen. [**Splenectomy in Cirrhosis of the Liver with Splenomegaly and Cytopenia**] *Deut. med. Woch.* 1956, Nov. 23, v. 81, No. 47, 1884-9, 1906, 3 figs. on pl. [29 refs.]

The author studied the effects of splenectomy in 10 Korean subjects (7 females) suffering from liver cirrhosis and splenomegaly. In 7 the



liver showed fine nodular cirrhosis (clonorchiasis present in 3); in 2, post necrotic cicatricial cirrhosis (1 with clonorchiasis). Five patients had clonorchiasis, 8 had concomitant malaria, 1 had paragonimiasis, 1 was alcoholic, and 1 was suffering from malnutrition. The excised spleens weighed 500 to 1,650 gm. Before operation 10 had some form of blood cytopenia, *viz.* anaemia, thrombocytopenia, leucopenia or pancytopenia (in which all cells were affected). Patients were followed up for 3 to 14 months after splenectomy. There was good haematological improvement in 6, fair in 3 and poor in 1 (a patient who had fine nodular cirrhosis with ascites, malaria and pancytopenia and who died 5 months after operation).

The following observations were made before operation and subsequently:—haemoglobin concentration; counts of erythrocytes, white cells and platelets; bleeding and coagulation times; sedimentation rate; total serum protein (and electrophoretic pattern); blood bilirubin concentration; thymol turbidity and cadmium turbidity; Takata reaction; bromsulphthalein retention. Anaemia was considered present if the haemoglobin concentration was under 65 per cent. and the erythrocyte count below 3.4 million cells per cmm. Minimal counts for other cells were: white cells 4.3 thousand per cmm.; thrombocytes 135 thousand per cmm. Indications for splenectomy were: cytopenia with corresponding hyperplasia of bone-marrow; lengthened bleeding time and frequent haematemesis; marked cytopenia with especially enlarged spleen. Liver biopsies were taken at the time of operation.

The author concludes from his own observations and a brief review of the literature that cytopenia associated with splenomegaly and resolved by splenectomy occurs in a great variety of conditions of different aetiology. Improvement in the patient after splenectomy is largely general and haematological, and takes place only when the liver damage is not too far advanced. Two possible mechanisms for the production of cytopenia are discussed, *viz.*, phagocytosis in the spleen and a humoral mechanism involving inhibition of development with or without discharge of cells in the bone-marrow. The absence of heavy deposition of pigment and erythrophagocytosis suggests that the anaemia is the result of some humoral effect acting on the haemopoietic centres, rather than destruction of erythrocytes in the spleen.

B. G. Maegraith

REIMANN, H. A. & SUKATON, R. U. **Djenkol Bean Poisoning (Djenkolism): a Cause of Hematuria and Anuria.** *Amer. J. Med. Sci.* 1956, Aug., v. 232, No. 2, 172-4.

Djenkol beans are sold in the markets of Java and Sumatra. They are eaten raw and cooked and "the ingestion of even one bean imparts a sulfurous feter to breath and urine".

Sometimes severe signs and symptoms appear within a few hours of eating the beans, even in those who have eaten them for the first time.

The syndrome includes lower abdominal and lumbar pain and dysuria. Gross haematuria may develop and in some patients there is oliguria and occasionally temporary anuria. The blood urea may rise in the acute stages. Treatment with sodium bicarbonate, orally or parenterally, relieves the picture.

A summary is given of 16 cases admitted to the Djakarta Central Hospital. There is a discussion on the possible toxic action of the bean and its relation to the toxicity of *Vicia fava*. It is suggested that djenkolic acid (an amino-acid rich in sulphur) which can be extracted from the beans may be the toxic factor involved.

B. G. Maegraith

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## PARASITOLOGY : GENERAL

SWELLENGREBEL, N. H. **Parasitology, a Chapter of Ecology.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, Sept., v. 8, No. 3, 274-80.

How revealing it would be if every scientific worker could compare his opinions on retirement with those he held on appointment half a century earlier. This is what Swellengrebel has done in a parting address to the University of Amsterdam. He shows that his original idea that the study of morphology holds first place in parasitology is now erroneous, though this standpoint led to many fruitful results. Thus in elucidating the cause of amoebic dysentery, a single amoeba was first found in the human gut; then a detailed study of the morphology revealed first 2 and later 4 or more species, of which only one was pathogenic. Later still, it was discovered that this was not the whole story, because the dysentery amoeba was found to be not always pathogenic; it only caused disease if it became invasive, changing its feeding habits from the consumption of bacteria and starch to erythrocytes—the former state being called “commensalism”, the latter “commensal infection”. Equilibrium between host and parasite (*i.e.*, commensalism) can be disturbed not only by the parasite becoming invasive but by excessive multiplication, as occurs sometimes in *Giardia intestinalis*, in the early stages of *Trypanosoma lewisi* in young rats or in *T. rhodesiense* in man, but never in the antelope, its natural host. In communities, this development of commensalism is well seen in malaria in highly infected regions where the working (adult) section of the population becomes completely adjusted.

The emphasis on the importance of morphology has changed during these years to that of ecology, and today parasitology is essentially the study of “living beings serving as environment”. P. C. C. Garnham

SVENSSON, Ruth. **Intestinal Parasites in Himalayan Regions.** *Amer. J. Hyg.* 1956, Sept., v. 64, No. 2, 158-69. [18 refs.]

This paper reports the results of surveys of intestinal parasites carried out in the lower Himalayas in 3 localities at altitudes ranging from 4,000 to 9,000 feet. One spontaneously passed stool was examined by single saline and iodine preparations from each of 504 persons. The incidences recorded must therefore be regarded as low. In view of the considerable difference between the results of examination of single and of repeated stool specimens the author records together the figures for *Entamoeba histolytica*, *E. coli* and *Endolimax nana*, regardless of species, as percentages of possible infections (the number of persons examined  $\times$  3). The resulting figure, the "compound incidence", reduces the deviations and standard error and enables the results to be compared with earlier surveys and those in other areas. This index is compared with the "combined amoebic prevalence rate" of BROOKE *et al.* [this *Bulletin*, 1956, v. 53, 590], which, when applied to the author's findings, shows greater deviation from the means and greater difference in demonstrability between the sexes than the compound incidence.

The incidences of protozoal infections in the various groups were related to sanitary status and habit. Even in localities where sanitary arrangements were poor, infections with intestinal protozoa were comparatively low, probably owing to the small amount of handling of cooked food other than by the consumer. In areas where Western hygiene and sanitation had been adopted protozoal infections were less prevalent than in other places including even Western countries, but good sanitation alone did not lower infection rates unless the habits originally prevailing among these hill tribes were changed.

Helminthological findings revealed infections with *Ascaris lumbricoides* and *Trichuris trichiura* in all groups and hookworm in all but one. No helminth eggs were found in 20 Tibetan patients and it is suggested that high altitudes and dryness prevent development of immature helminths to the infective stage outside the host.

The results are set out in 8 tables.

T. H. Davey

ATCHLEY, F. O., HEMPHILL, E. C. & HUNT, D. W. **Current Status of Intestinal Parasitism of Man in Eastern Kentucky.** *J. Parasitology.* 1956, Oct., v. 42, No. 5, 505-9.

The authors examined single faecal specimens from persons in 10 areas in the eastern Kentucky mountains in 1955. As samples could not be examined immediately, protozoan trophozoites were excluded from the study. The specimens were examined by direct smear and by formalin-ether sedimentation.

In the first quarter of the year, 843 specimens were examined in 8 of the areas. In April-July, 1,800 specimens were examined in all 10 areas, but in this case attention was directed solely to helminths. The results



are set out for age-groups and by location in 4 tables. The following were the principal findings, in percentages of positive specimens.

	Jan.—March (843 specimens)	April—July (1,800 specimens)
<i>Entamoeba histolytica</i>	3.3	—
<i>Endolimax nana</i> ...	5.9	—
<i>Giardia</i> ... ..	9.5	—
<i>Ascaris</i> ... ..	26.8	21.3
<i>Trichuris</i> ... ..	24.2	14.6
<i>Strongyloides</i> ...	1.2	2.6
<i>Hymenolepis</i> ...	1.3	1.4
Hookworms ... ..	—	0.5

In the first series, 56 per cent. of persons harboured at least one species of parasite. In both series, *Ascaris* was most prevalent, and 1 of every 3 children under 10 was infected. The paucity of hookworm infection is noted, as is the low percentage of amoebic infection in the first series.

*Trichuris* egg-counts were low (only 1 of 263 infected persons had a count greater than 10 per mgm. of faeces) but 6 per cent. of those harbouring *Ascaris* had egg-counts greater than 50 per mgm. and were thus considered to be heavily infected with this parasite.

H. J. O'D. Burke-Gaffney

REYE, R. D. K. & TEN SELDAM, R. E. J. **Pneumocystis Pneumonia.**  
*J. Path. & Bact.* 1956, Oct., v. 72, No. 2, 451–8, 7 figs. on 2 pls.  
[31 refs.]

“Two cases, the first to be reported from Australia, of an interstitial plasma-cell pneumonia due to *Pneumocystis carinii* are described.

“These cases are compared with others reported in the literature and salient features of the aetiology, epidemiology and clinical features of the disease are discussed.”

LINHARTOVÁ, Alena. Experimentelle Pneumocystose bei Ratten.  
[**Experimental Pneumocystosis in Rats**] *Zent. f. Bakt.* I. Abt.  
Orig. 1956, v. 167, No. 2, 178–86, 4 figs. [24 refs.]

The English summary appended to the paper is as follows:—

“The method of the experimental pneumocystosis in rats after long lasting application of cortisone is described. The augmentation of *Pneumocystes* in the lung of rats requires the activation of a latent infection. The intraperitoneal inoculation did not even succeed in animals treated that way. A negative result has also been observed in the intraocular inoculation of Guinea-pigs.”

CHOQUETTE, L. P. E. **Significance of Parasites in Wildlife.** *Canadian J. Comp. Med.* 1956, Nov., v. 20, No. 11, 418–26. [26 refs.]

**ENTOMOLOGY AND INSECTICIDES: GENERAL  
ZOOLOGY**

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

BEIRNE, B. P. [Compiled by.] **Collecting, Preparing and Preserving Insects.** 133 pp., 108 figs. Pub. 932. 1955, May. Canada: Department of Agriculture, Science Service, Entomology Division. [\$00.50.]

VARGAS V., M. Llave numérica para identificación de larvas en cuarta fase de Anophelini en Costa Rica. [**Numerical Key to the Fourth Instar Larvae of the Anophelines of Costa Rica**] *Rev. Biología Trop.* San José, Costa Rica. 1956, July, v. 4, No. 1, 27-34, 5 figs. [11 refs.] English summary (5 lines).

A synopsis is given of the anopheline mosquitoes known, or reported, to occur in Costa Rica, with an up-to-date list of the 18, and 2 doubtful, species involved. In two cases the relevant subspecies have been newly determined as *Anopheles* (*A.*) *pseudopunctipennis pseudopunctipennis*, and *A.* (*Nyssorhynchus*) *triannulatus triannulatus*.

A numerical key to the 4th instar larvae of the species listed, based upon chaetotaxy and spiracular morphology, is provided. [See also this *Bulletin*, 1940, v. 37, 357.] N. R. Phillips

LARIVIÈRE, M. & ABONNENC, E. Notes biologiques et morphologie de l'oeuf, de la larve et de l'adulte de *Culex antennatus* Becker 1903. [**Biological and Morphological Notes on the Egg, Larva and Adult of *Culex antennatus***] *Bull. Inst. Français d'Afrique Noire.* 1956, Oct., v. 18, No. 4, 1191-9, 3 figs.

SMITH, S. A. **Some Observations on the breeding of *Taeniorhynchus* (*Mansonioides*) *africanus* (Theo.) in the Laboratory.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, Sept., v. 50, No. 5, 458-9.

Little success has been obtained previously in rearing *Taeniorhynchus* in the laboratory. JAYEWICKREME and NILES [this *Bulletin*, 1953, v. 50, 52] succeeded in rearing *T. uniformis* to the seventh generation. Egg masses of *T. africanus* sent by air from Uganda were hatched in tap-water at 25°C. on arrival in London; egg-masses taking 5-7 days in transit did not hatch. Egg masses should be placed in water not more than 4 days after oviposition. A suitable medium for the larvae was a mixture of 6 gm. of powdered dog-biscuit in 500 cc. of tap-water, allowed to stand for 5 days in a flask in an insectary at 25-27°C. This medium was added

in equal volume to the tap-water in which the eggs had hatched and a sprig of *Salvinia auriculata* was added. The larvae attached themselves to the roots of this plant.

Twice weekly, for 3-4 weeks, one-third of the water of the culture was removed and replaced by an equal volume of stock biscuit infusion. At the same time the *Salvinia* plant was replaced. The culture was found to be rich in infusoria and bacteria. To prevent emerging adults from being caught in scum at the surface of the culture plants with pupae attached were removed and placed in tap water. Nine males and 12 females were reared from one batch of 100 eggs. Adults were kept in a 10-inch cubical cage draped with a damp cloth, and fed on soaked raisins, sugar and human blood. Two egg masses were deposited on *Salvinia* placed in the cage by females 21-28 days old, which had been kept at about 26°C. One of the egg masses hatched but the larvae died after a few days. Further work is in progress.

B. R. Laurence

STERNBURG, J. & KEARNS, C. W. **Pentachlorocyclohexene, an Intermediate in the Metabolism of Lindane by House Flies.** *J. Econom. Entom.* 1956, Aug., v. 49, No. 4, 548-52, 4 figs. [10 refs.]

Other workers have shown that several isomers of BHC (whether insecticidal or not) are metabolized at a rapid rate by resistant house-flies and more slowly by normally susceptible ones [OPPENORTH, this *Bulletin*, 1954, v. 51, 1006; *ibid.*, 1955, v. 52, 488; BRADBURY and STANDEN, *ibid.*, 1955, v. 52, 103]. The type of degradation, is unknown, but there is no evidence of formation of trichlorobenzene (which is formed by alkaline dehydrochlorination) and the final metabolite is water-soluble. The present authors have obtained evidence for existence of pentachlorocyclohexene in resistant flies treated with gamma BHC and they believe it to be an intermediate product. The evidence is based on spectrophotometric-chromatographic and colorimetric tests and the authors believe that owing to improvements in technique they have identified some pentachlorocyclohexene, which Bradbury and Standen included with their estimates of unaltered BHC.

The authors consider that this intermediate metabolite is degraded to unknown compounds. They have shown that the DDT-dehydrochlorinase enzyme from resistant house-flies is not responsible for this metabolism of BHC isomers.

J. R. Busvine

MICKS, D. W. & MCKIBBEN, J. W. **Report of a Case of Human Intestinal Myiasis caused by *Leptocera venalicia*.** *Amer. J. Trop. Med. & Hyg.* 1956, Sept., v. 5, No. 5, 929-32, 1 fig.

"A case of human intestinal myiasis due to *Leptocera venalicia* is reported. This species apparently has not been previously reported in connection with human myiasis. Larvae and pupae appeared in various



stool specimens over a period of five months. Except for occasional episodes of gastric distress and abdominal cramps, the patient was essentially asymptomatic. The patient probably ingested eggs or larvae with contaminated meat or cheese. The heavy fly population at the patient's home was conducive to myiasis."

See also p. 272, JACQUEMIN, Un dispositif pratique pour nourrir les Arthropodes hématophages. [**A Practical Apparatus for the Feeding of Triatomids**]

See also p. 346, SHIELDS & WALSH, "Kissing Bug" Bite.

VARGAS, L. Relación del papel patogeno de las garrapatas y lista de las especies Mexicanas. [**Pathogens transmitted by Ticks and List of Species of Ticks in Mexico**] Reprinted from *Gac. Méd. de México*. 1955, July-Aug.-Sept., v. 85, Nos. 4/5, 489-502. [29 refs.] English summary (8 lines).

A list is given of the ixodid and argasid ticks recorded from, or likely to occur in, Mexico; the range of the species into countries other than Mexico is also indicated. About half the paper is concerned with cataloguing briefly the pathogenic organisms infecting or transmitted by ticks in nature or experimentally. This list attempts to deal by species with ticks from all parts of the world and is not limited to those of Mexico.

D. S. Bertram

BURDEN, G. S. & COLE, M. M. **Effectiveness of Cyclothrin with Various Synergists against Body Lice.** *J. Econom. Entom.* 1956, Oct., v. 49, No. 5, 643-5.

"Laboratory tests were conducted with 15 synergists in combination with cyclothrin against the body louse, *Pediculus humanus humanus* L., in comparison with pyrethrins and allethrin standards. The mixtures were tested as cloth impregnants in beakers and as powders applied to small cloth patches.

"In the beaker tests the *alpha*-allylpiperonyl, the *alpha*-propylpiperonyl, the 4-(3,4-methylenedioxyphenyl)-*sec*-butyl, and the *alpha*-isopropylpiperonyl esters of chrysanthemumic acid, and the *alpha*-allylpiperonyl ester of fencholic acid were the more effective synergists for cyclothrin. However, pyrethrins with sulfoxide was more effective than cyclothrin with any synergist, and allethrin with sulfoxide was slightly less effective than cyclothrin with some of its better synergists.

"Pyrethrins and allethrin were completely effective at a lower concentration than cyclothrin, when each was used in combination with sulfoxide.

"In pyrophyllite powders cyclothrin was slightly slower in knockdown than allethrin or pyrethrins when combined with sulfoxide. On a residual basis synergized cyclothrin and allethrin were less effective than pyrethrins."

PAULINI, E. Adsorção do DDT pelo barro. [**Adsorption of DDT by Mud**] *Rev. Brasileira Malariologia*. Rio de Janeiro. *Publicações Avulsas* No. 6. 1956, 13 pp., 4 figs. English summary.

Observations were made on the adsorptive properties of mud-blocks made from soils of Brazil (and Uruguay) with the conclusion that the colloidal content and not the iron oxide fraction controls the sorption of DDT crystals [see this *Bulletin*, 1956, v. 53, 682]. D. S. Bertram

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## LABORATORY PROCEDURES

LANZO, A. Su alcune prove di labilità colloidale del siero nelle principali malattie degli eritrei. [**Colloidal Lability Tests on the Serum in Persons with the Prevailing Diseases of Eritrea**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1956, Oct., v. 37, No. 10, 555-67. [10 refs.]

The English summary appended to the paper is as follows:—

"The author carried out the following tests for the colloidal lability of the serum in 50 normal Eritrean individuals and in 297 patients affected by the principal diseases seen in Eritrea: Takata-Ucko, Hanger, Mac Lagan, Bungenberg De Jong, Gross, Wuhrmann-Wunderly.

"In the normal individuals a weak reaction was obtained which is to be related to poor nutrition and chronic parasitosis that can induce lesions in the liver mesenchyma. In the pathological cases the results of the tests, except Mac Lagan's reaction, are fairly comparable to the average of the results obtained in Europe."

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## REPORTS AND SURVEYS

REGISTER, P. T. "The Study of Primitive Communities and its relation to Social Medicine"—with particular reference to the Muruts and Dusuns of North Borneo. *J. Roy. Inst. Pub. Health & Hyg.* 1956, Nov., v. 19, No. 11, 350-76. [57 refs.]

Owing to the rapid changes in primitive communities resulting from contact with alien cultures, and in order to obtain knowledge of the

natural history of disease, every opportunity should be taken for studying medical anthropology among them. The primitive tribe forms a homogeneous group in which no selection is required because all individuals share a common culture and environment, and surveys can be carried out on a scale impossible in more advanced communities. Such a survey is reported in this paper dealing with the physical and social anthropology of the Murut and Dusun peoples of North Borneo with special regard to their health.

There are 4 sections of the paper. The first deals with the methods of investigation and the data needed. The second presents some of the interesting findings. The third discusses the principles employed in planning a programme of preventive medicine among these tribes, and finally the author draws attention to the influence investigations such as these could have on social medical studies in more civilized communities. In the first two sections there are numerous references to the literature dealing with the findings in under-developed areas throughout the world.

[It is impossible to abstract this very interesting paper, which should be read by all those concerned in medical work in primitive communities, since it contains much wisdom and sound advice concerning the advancement of hygiene in such areas. Many who are interested in social medicine in technologically developed communities will be interested in the contrast between primitive and advanced people in regard to social disease and the factors responsible.]

T. H. Davey

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## BOOK REVIEW

MAKAR, Naguib [M.B., Ch.B., F.R.C.S.]. **Urological Aspects of Bilharziasis in Egypt.** With a foreword by Gordon GORDON-TAYLOR, K.B.E., C.B., F.R.C.S., etc. pp. viii + 208, numerous illustrations. 1955. Cairo: Société Orientale de Publicité.

Professor Naguib Makar's book *The Urological Aspects of Bilharziasis in Egypt* is probably the best clinical treatise so far published on the effects of schistosomal invasion of the genito-urinary system. It could only have been tackled by one who has had long personal contact with those afflicted by this form of the disease. The reader is immediately struck by the gravity of the disease in this part of the body and the reviewer agrees with most of the findings. After studying this work one is left with the impression that schistosomiasis is still one of the scourges of the tropical world and now that malaria is being overcome might be regarded, in Africa at any rate, as the most serious disease with which the public health authorities have to deal.

Always in the background is the pathological approach and any subject tackled in this manner is likely to be well done. Certain sentences are particularly apt and the words well chosen. An excellent example is the



following paragraph in the section on Surgical Pathology in Chapter II:—  
“Indeed, the bilharzial bladder in its chronic state of disease is a sort of haematobial cemetery with vaulted, peaked, or flattened tombs for the underlying buried ova, the various names given to the bilharzial manifestations, *e.g.*, ‘nodules’, ‘polypi’, ‘sandy patches’, etc. being their pathological epitaphs.”

The style is clear and the subject matter well presented in an orderly and accepted manner. The pattern throughout the text is uniform, dealing first with epidemiology and pathogenesis, then clinical features, prognosis and finally treatment.

A review of this kind must of necessity confine itself to the points which strike the reviewer, but no doubt details not touched upon here would excite the interest of other readers.

Professor Makar divides the late effects of the disease in the bladder broadly into two types—the *atrophic* and the *hyperplastic*. So far, although this fact has been commented on in the past, not sufficient interest has been shown in the ultimate results of the disease on the bladder capacity. For instance recent work in Southern Rhodesia appears to show that the small contracted bladder, with its increased intravesical pressure and thus its secondary effect on the kidneys, is one of the more important causes of hydronephrosis. This fact has led workers in Southern Rhodesia to try the ileocystoplasty operation in patients with small bladders.

An excellent account is given of the bilharzioma, the smallest inflammatory focus of the disease which corresponds to the miliary tubercle in tuberculosis. The author draws particular attention to the effects the disease may have on the blood vessels lying in the schistosomal inflammatory tissue. Because of the presence of ova in the tissues the vessels, especially the arterioles, undergo medial and intimal hypertrophy and this may be followed by complete occlusion. Doubtless the blood supply to the bladder is affected, and further in the later stages of the disease these vascular changes account for the failure to restore the function of the affected part.

Professor Makar discusses the effects of the disease on the bladder under two headings—“Bilharziasis of the Mucous Membrane” and “Submucous Bilharzial Infiltrations”. Of the mucosal effects he specially stresses the schistosomal ulcer which is small, with a sharp, thin margin and a superficial, pale, yellowish floor. It is mostly seen on the posterior wall of the bladder and is usually single, but may extend when secondarily infected. Other mucosal lesions he describes are hyperaemia, tubercles and nodules, sandy patches, a ground-glass mucous membrane and the papilloma.

Of particular interest when the submucosa is infiltrated is the pathological effect of the inflammatory masses which, when of sufficient size, cause broad and flattened irregular projections or elevations varying in size from that of a peanut to that of a walnut. These are commonly



encountered in the posterior and lateral bladder walls and are important because they are liable to be mistaken for malignant growths. Professor Makar aptly describes this lesion as the "bilharzial plateau".

He considers a schistosomal bladder an easy prey to infections, since "its unhealthy mucosa cannot grant it the protection of normal membranes". Although the reviewer agrees that *Escherichia coli* and other secondary invaders are often seen, it is rare, in his experience, to meet a case of acute cystitis in a schistosomal subject. Most of the symptoms can usually be attributed to the lesions produced by the schistosomal disease itself. The author also holds that schistosomiasis directly plays an important role in the production of vesical calculus. This may be so in Egypt, but in Central Africa it is extraordinary how rarely it is found in the African suffering from schistosomiasis. When encountered it is due to marked secondary infection as in a pyonephrotic sac, and not to the schistosomal disease itself.

Schistosomal infiltration of the bladder muscles leads ultimately to reduction of its capacity owing to marked fibrosis, and the inside of such a bladder has been likened to the gizzard of a turkey ("gizzard bladder"). The author unfortunately makes little further comment on this important complication. He observes, however, that when the fibrosis is localized to the bladder neck, urinary obstruction results.

Professor Makar quite correctly stresses the rarity with which the disease is confined to the bladder and it would be safe to assume that the ureters are involved to a varying extent at the same time, and occasionally the prostate and seminal vesicles as well.

He does not omit mention of the calcified linear shadows or, in more advanced cases, of the laminated calcified outline seen on X-ray, and he draws attention to the value of this diagnostic aid. But one might disagree with him when he states: "Next to cystoscopy, as an important means of studying the pathology of vesical Bilharziasis comes radiography, the one being not uncommonly complementary to the other". Except in this particular investigation radiography has little value as a diagnostic procedure in schistosomiasis of the bladder.

There follows a good general account of the symptomatology of vesical schistosomiasis and its diagnosis and treatment. No mention is made of the value of the relatively simple rectal biopsy procedure by which the terminal-spined ova may not uncommonly be shown in the rectal mucous membrane.

As is to be expected much space is devoted to the relationship between vesical cancer and schistosomiasis. The author's method of dealing with the subject is to be commended. Although it is now some years since Professor Ferguson drew attention to this association, it is still not known for sure how schistosomal infection of the bladder gives rise to cancer. Makar gives cogent arguments which favour the schistosomal causation, such as low age incidence in schistosomal cases and the higher incidence of vesical carcinoma in Egypt than in non-schistosomal countries. In



Egypt too the disease heads the list of all cancers. The author has much to say on the importance of cystitis glandularis and cystitis cystica, not uncommon findings in schistosomal cystitis. In cystitis glanularis invaginations of the transitional epithelium dip into the bladder sub-mucosa. These the author regards as being definitely premalignant, but not cystitis cystica which is a degenerative disorder.

Professor Makar makes the interesting observation that whereas in simple schistosomiasis a linear or laminated shadow is seen on X-ray, in malignant disease the shadows are denser and more irregularly distributed over a smaller bladder field.

He reports that in 30 per cent. the growth is a transitional-cell carcinoma, in 40 per cent. squamous-cell carcinoma, in 10 per cent. columnar-cell and in some 20 per cent. of an anaplastic variety.

The ultimate result of schistosomal ureteral involvement, wherever its site, is a gradual dilatation of the tube proximal to a stenosis extending from below upwards.

Among the symptoms of ureteritis mentioned are haematuria and pain, but whereas the pain, from its position, can reasonably be attributed to ureteral disease it is not easy to follow his confident statement that "Haematuria is commonly of a mild degree, though at times it may be marked". As the author considers the problem of ureteric disease one of stenosis or stricture it follows that his treatment is largely concerned with dilatation of the stenosed part of the ureter, excision of the stenosed portion or transplantation of the ureter into a new site in the bladder. He makes no reference to the possibility of dilatation of the ureter without stricture. It is also possible that a small bladder with high tension may be responsible for dilatation of the ureter and hydronephrosis.

There finally follows one of the best descriptions of the effects of the disease on the seminal vesicles, prostate, testis and epididymis. The seminal vesicles are often infested by the ova of *S. haematobium* and symptoms include a dull ache in the perineum often aggravated by coitus, and haemospermia not uncommonly follows. Sterility is a late result. On rectal examination the vesicles are enlarged and nodular. Prostatic involvement is also not uncommon, the organ being enlarged and tender, and may also be responsible for haemospermia. Orchitis he reports to be rare but schistosomal disease of the globus major of the epididymis and neighbouring part of the spermatic cord are commonly seen. The affected portion of the epididymis becomes enlarged and the spermatic cord nodular. In some cases a mass may be felt on the cord and a secondary hydrocele too may appear.

The illustrations on the whole are very good and clear. But although the paper is of good quality a serious defect in the production of the book is its extremely poor binding, which allows the pages to fall out. It would be wise for every student in the medical schools of Africa and wherever the disease is encountered to read this book so as to become thoroughly acquainted with the disease.

M. Gelfand